

CTO

**IMAGES
THAT
MEAN
BUSINESS.**



IMAGING INFORMATION SYSTEMS

This special issue of CIO salutes the most innovative users of information technologies. It's no surprise to us that imaging is one of the strongest trends in information systems today. Eastman Kodak Company has been applying imaging science to the flow of business documents for over 60 years now. No other vendor can bring our level of understanding to imaging applications.

If imaging is in your future, talk to Kodak. We've got what you need to face the tough decisions and come out a winner...because images are our business.



AUGUST 1990
VOLUME THREE NUMBER ELEVEN
SEVEN DOLLARS

THE MAGAZINE FOR INFORMATION EXECUTIVES

SPECIAL ISSUE

.....
The
1990
CIO 100

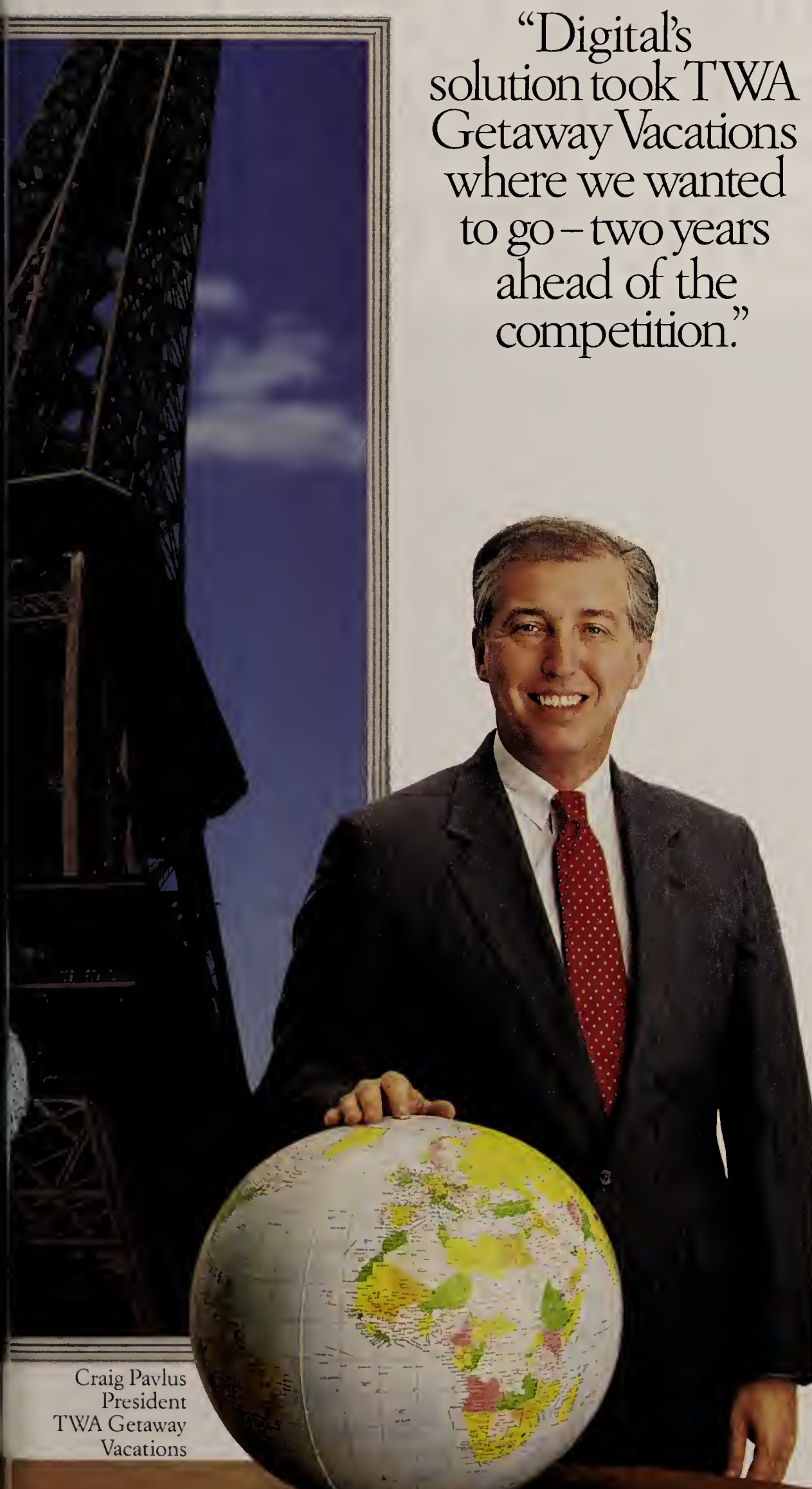
.....
The
I.T. AND
INNOVATION
LINK



AN INTERNATIONAL DATA GROUP PUBLICATION



© Digital Equipment Corporation 1990. The DIGITAL logo and Digital has it now are trademarks of Digital Equipment Corporation.

A man in a dark suit, white shirt, and red tie with white polka dots is smiling and holding a large globe. The globe shows the Americas. In the background, a bridge is visible against a blue sky with clouds.

digitalTM

“Digital’s solution took TWA Getaway Vacations where we wanted to go – two years ahead of the competition.”

“Today’s customers want the ease of a package tour, while choosing their own dates, destinations, even accommodations. We needed a system to handle the complexity of servicing those choices, in real time. Digital found the perfect third-party software, custom-designed a system around it, then turned it on in under three months. No other computer company could have done that.

“With Digital, from a single desktop computer we book, price and confirm an entire vacation — flight, hotel, transfers, information that’s from different sources—in less than six minutes. We trust this system so much, we guarantee all reservations and all prices. So far, we’ve managed 60% more business this year with just 5% more payroll.

“What’s next? Repeating our success globally, wherever we set up shop. Digital’s given us two years of strategic advantage. That’s two years we’ve been able to offer our customers what Digital gives us: responsiveness and choice the competition is hard-pressed to match.”

The rewards of working together.

Digital plans, designs, implements, and fully supports systems specific to the demands of your company, and your industry. They are solutions that work, in real time, in the real world.

Today, Digital’s custom-designed systems give you an elegantly simple way for your people to work together more productively, more creatively, more efficiently, more competitively.

To learn more, write to Digital Equipment Corporation, 129 Parker Street, Maynard, MA 01754-2198. Or call your local Digital sales office.

A way to work together like never before.

**Digital
has
it
now.**

Craig Pavlus
President
TWA Getaway
Vacations

Technically, It's An Architecture. But It's Really Something Else.

Freedom to choose. Freedom to change. Freedom to grow. The basic tenets underlying the most advanced, and independent architecture ever developed.

The Computing Architecture For The 90s from Computer Associates.



Since it encompasses SAA, NAS and the other industry standards, CA90s gives you unprecedented freedom to integrate. Across platforms, operating systems, different vendors—throughout your entire corporate environment.

Today. Not next year. Next month. Next week. CA90s is here today. Unlike other architectures, CA90s is already supported by the world's broadest range of software solutions.

But that's only the beginning. The best news is in how these applications work together. By sharing common services and advanced technology, CA software brings you the highest levels of integration and automation in the world.

And Tomorrow. With CA90s, you'll be prepared for whatever happens in the future. It provides responsible, efficient ways to migrate to new technology, while protecting the enormous investment you've made in your existing technology.

Altogether, CA90s is the architecture that offers you the freedom to face tomorrow.

And it's ready just when you need it the most.

Today.



©1990 Computer Associates International, Inc.,
711 Stewart Avenue, Garden City, NY 11530-4787 1-800-645-3003
CA90s is a trademark of Computer Associates International, Inc.



SPECIAL ISSUE—THE CIO 100

The Creative Process

Where do information technology and innovation intersect? Just about everywhere. The introduction to our third annual CIO 100 presents some of the findings of this year's investigations, along with assorted charts and an explanation of our methodology. *By Allan E. Alter*

14



The innovation role model 22

Cover illustration by Mark Fisher

The Company Innovation Built

Forced in its earliest years to improvise a new identity for itself, 3M has carried on an inventive tradition to become the very model of a modern innovator. *By David Freedman*

22

Putting Genius to Work.

According to innovation expert Rosabeth Moss Kanter, coming up with new ideas may be the easy part. The hard part is to devise a structure for bringing new ideas into the mainstream of company operations. *By Allan E. Alter*

34

Who, What, Where, When . . .

A chart listing all of the 1990 CIO-100 companies, along with information about their top IS executives.

44

INNOVATION ESSAYS AND PROFILES

Managing Innovation

Because innovation is a process, not a flash of lightning, special strategies are needed to encourage and enable it to occur. With a profile of Corning Inc. *By Kathleen Melymuka*

57

Being Big/Acting Small

Corporate enormity can crush the creative spirit—unless big companies can mimic some of the strengths of smallness. With a profile of Millipore Corp. *By Meghan O'Leary*

63



Transparent IS 58



Directing the process 57

Speed to Market

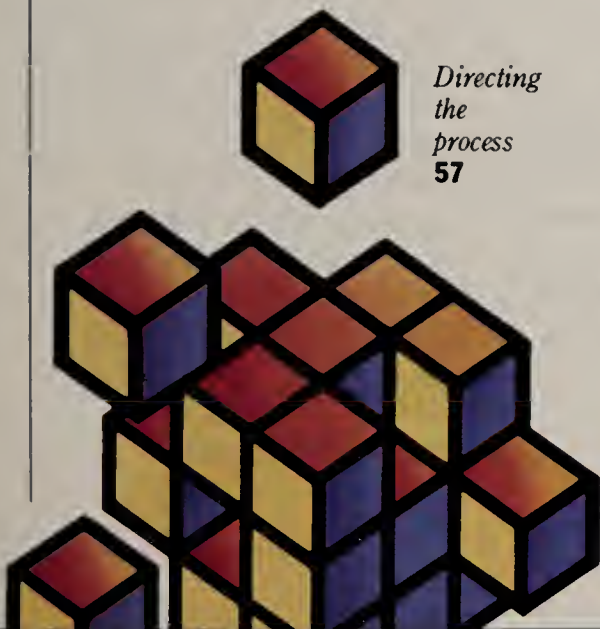
Some companies beat the competition by beating the clock. Technology can enable rapid response, flexibility and nimbleness. With a profile of Alza Corp. *By Meghan O'Leary*

67

Sharing Information

One way to innovate is to eliminate needless barriers to effective communication. A good telecom infrastructure can shrink a global operation to neighborhood proportions. With a profile of AB SKF. *By Paul Konstadt*

71



A black and white photograph of a rolled-up scroll. The scroll is unrolled in the middle, revealing the text "Don't seek and you shall find." written in a stylized, gothic font. The letter "D" is particularly large and ornate, with intricate flourishes. The scroll itself has a textured, aged appearance with some fraying at the edges.

**Don't
seek and you
shall find.**

Introducing the information system that reverses a time-honored proverb.

The quantity of information at your disposal is increasing at an astronomical rate. Unfortunately, that's also true of the knowledge and dollars required to access it.

So Dow Jones has created a system that simply removes those barriers.

It's called DowVision™ and it does what no information system has ever done. It eliminates your search. For a fixed monthly fee, we'll gather, edit and automatically feed your company *just* the news it needs. Vital, real-

time news from Dow Jones News Services, the preeminent publisher of business and financial news.

By working with software developers—American Real-Time Services, Desktop Data, GESCAN and Verity, among others—we can customize a system for your company based on its information needs. Each employee can get a separate profile, too.

Let's say you're interested in the chemical industry. All day long, we'll deliver just the related stories right to

your desktop computer. No muss. No fuss. No search.

And you'll be on the job with a head full of useful facts and a head start on your competition.

Which reverses another time-honored proverb: Quick and steady wins the race. For more on DowVision, call 1-800-522-3567, Ext. 218. In N.J., call 1-609-520-8349, Ext. 218.

DOWVISIONSM
The lifeblood of business.SM

DowVision is a service mark of Dow Jones & Company, Inc. © 1990 Dow Jones & Company, Inc. All Rights Reserved

INNOVATION ESSAYS AND PROFILES (cont.)

Knowing the Market

Market conditions don't sit still for long. Brand loyalties are vanishing. Customers have changing needs and preferences. Technology helps companies stay on top of change. With a profile of **The Procter & Gamble Co.** *By Paul Konstadt*

75

Customer Service

In a hot competitive climate, adding value through customer service can help companies win—and keep—new business. With a profile of **Stew Leonard's.** *By Deborah Cooper*

79



Bread and circuses 80

Quality

One way to keep customers happy is to deliver quality. And like other virtues, quality grows from the inside out. With a profile of **Xerox Corp.** *By Paul Konstadt*

83

Product Development

Creating products that people will want to buy isn't easy. IT can help eliminate guesswork and streamline processes. With a profile of **The Boeing Co.** *By Amy Bermar*

87

Japan

If customer service is achieving new prominence in American companies, in Japan it is a full-blown mania. With a profile of **Shiseido Co. Ltd.** *By Dennis Normile*

91

Accompaniments

Meet the Judges 94

The CIO-100 Index 95

Cosmetic changes 92



The right stuff 87

DEPARTMENTS

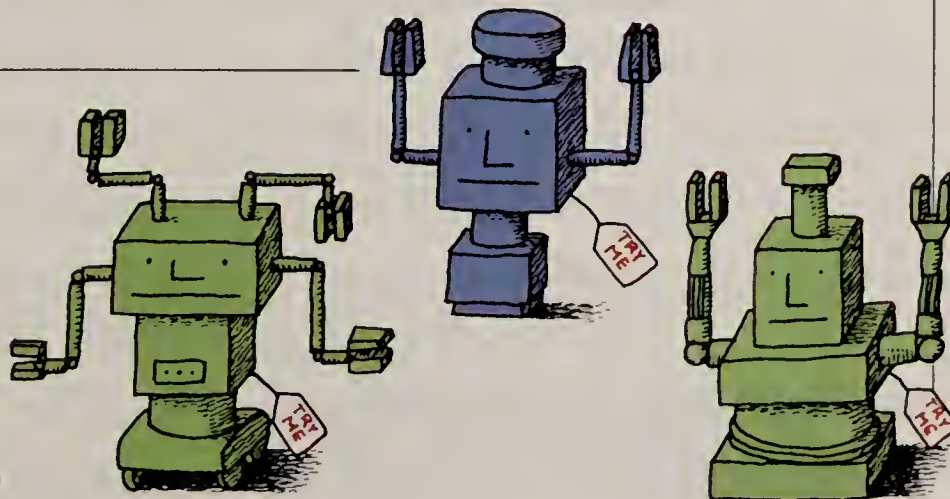
Trendlines 10

- ▶ Marketing technologies
- ▶ Shared factories
- ▶ IS salaries and costs
- ▶ VDT health
- ▶ MIS manners
- ▶ French school for CIOs
- ▶ Career moves
- ▶ Data dictionary
- ▶ Comic strip

Conference Call 99

Rating IS consulting firms

Events / Index 102



CIM for rent 10

1990. The missing north of New York.



Integrated network management is about to undergo a major evolution. Thanks to the new NYNEX® ALLINK™ Operations Coordinator.

Chances are your corporate network is made up of elements from a variety of manufacturers. The people at the NYNEX Science and Technology Center know that. Which is why they invented ALLINK.

ALLINK integrates information from your existing network element managers. So you can make better network management decisions. While preserving your investment in existing systems. This major breakthrough is now available through NYNEX Information Solutions Group.

This application heralds the introduction of a new concept in network management called the NYNEX ALLINK Network Management Solution. It will become a seamless, integrated network

link is discovered



management system, streamlining everything from operations to administration, performance and design.

If your company is digging around for a new and innovative solution, the NYNEX family of companies would like to help. We offer you everything from communications and computer systems, to professional services, to advanced software and systems and network integration. Call us at 1 800 535-1535 and get a closer look at what's been missing from connectivity.

Need to communicate? Need to compute? The answer is

NYNEX[®]

It's that time of year again—August, the Month of the *CIO 100* (now in its third annual edition). Unlike other periodicals that list the top 10, 100, 500 or 1,000, *CIO* is not satisfied to look at our top 100 in the same way each year. This reinvent-the-wheel mentality requires our editorial group to spin a lot of wheels, but in the process we learn a tremendous amount about businesses and their strategies.

This year we took a giant leap of faith. Instead of focusing first on the IT component, we decided to examine innovation as an organizational phenomenon. Our goal was to see whether there is a high correlation between enterprises that are considered highly innovative and their reliance on information technology. To do this we solicited nominations of innovative enterprises from gurus whose expertise lies outside information systems.

Our search for the innovators was led by Senior Editor Allan E. Alter, who as usual put us through intellectual hoops in selecting the winners. Although we are the first to admit

that our list may not stand up to rigorous statistical analysis, we consider our methodology to be sound.

Having identified the innovators, we surveyed their information executives to learn how these companies valued IT. Our response was impressive—78 organizations filled out our questionnaire. Of these, 50 indicated that information technology was extremely important to the process of innovation. We expected to find a link between IT and innovation, but the strength of that link was impressive.

We then decided on some basic categories where innovation spurs excellent business results—for example, customer service, speed to market, sharing information within the organization, and quality. Thanks are due to Senior Writer Paul Konstadt and Staff Writer Meghan O'Leary whose extensive research and reporting on those categories contributed greatly to the perspective in the articles and profiles featured in our various sections.

Longtime *CIO* contributors David Freedman, Deborah Cooper and Kathleen Melymuka added their usual zest. Contributors Amy Berman and Helen Pike provided assistance to our group effort.

Without a doubt, our effort would have been bogged down without the supervision of Managing Editor Lew McCreary and Associate Editor Abbie Lundberg, who kept everyone on track and played the role of voices-of-reason as well as adding clarity to each and every word. Copy Editor Cornelia Kennedy logged long hours seeking out innovators around the globe. And Editorial Assistant Megan Santosus tracked down immense amounts of background information and put our questionnaires through fax acrobats.

Last, but not least, Art and Design Director Mary Marshall and Assistant Art Director Moira Gillis were wizards in creating a special look for the *CIO 100* that illustrates our coverage in a bright and organized way.



Marcia Blumenthal



© By CIO Publishing, Inc.

Publisher/Editorial Director JOSEPH L. LEVY

Editor-in-Chief MARCIA BLUMENTHAL
Managing Editor LEW MCCREARY
Art and Design Director MARY LESTER MARSHALL
Senior Editor ALLAN E. ALTER
Associate Editor ABBIE LUNDBERG
Senior Writer PAUL KONSTADT
Staff Writer MEGHAN O'LEARY
Copy Editor CORNELIA KENNEDY
Editorial Assistant MEGAN SANTOSUS
Assistant Art Director MOIRA GILLIS

Associate Publisher/Director of Advertising Sales ROBERT E. BLOCK
Marketing Services Manager LORI CARDARELLI
Business/Circulation Manager LESLIE L. FALKNER
Administration Manager NANCY A. BRYSON
Assistant to the Publisher DIANE MARTIN
Advertising Sales Assistant LISA B. SHIFMAN

Contributing Writers Amy Berman, Deborah Cooper, David Freedman, Kathleen Melymuka

CIO Editorial Advisory Board Gary Biddle (American Standard Inc.), Ronald T. Brzezinski (Coopers & Lybrand), William L. Harrison (The Hartford), James S. Marston (American President Companies Ltd.), Pat Mullen (Digital Equipment Corp.), John F. Rockart (Center for Information Systems Research), Patricia M. Wallington (Xerox Corp.)

Editorial Offices CIO Publishing Inc., 492 Old Connecticut Path, P.O. Box 9208, Framingham, Mass. 01701-9208 (508) 872-8200

IDG Communications, Inc.

Board Chairman PATRICK J. MCGOVERN
President WALTER BOYD
Vice Chairman AXEL LEBLOIS
Executive Vice President WILLIAM P. MURPHY

CIO is a publication of International Data Group, the world's largest publisher of computer-related information. International Data Group publishes over 130 computer publications in more than 40 countries. Nineteen million people read one or more International Data Group publications each month. International Data Group's publications include: **Argentina's** Computerworld Argentina; **Asia's** Asian Computerworld; **Australia's** Computerworld Australia; **PC World, Macworld**; **Austria's** Computerwelt Oesterreich; **Brazil's** Data-News, PC Mundo; **Canada's** ComputerData; **Chile's** Informatica, Computacion Personal; **Colombia's** Computerworld Colombia; **Denmark's** CAD/CAM World, Computerworld Danmark, PC World, Macworld, Unix World; **Finland's** Mikro PC, Tietoviikko; **France's** Le Monde Informatique, Distributique, InfoPC, Telecoms International; **Hungary's** Computerworld SZT, Mikrovilag; **India's** Computers & Communications; **Israel's** People & Computers; **Italy's** Computerworld Italia, PC World Italia; **Japan's** Computerworld Japan, Infoworld, Publish; **Korea's** Hi-Tech Information/Computerworld; **Mexico's** Computerworld Mexico, PC Journal; **The Netherlands'** Computerworld Netherlands, PC World, Amiga World, **New Zealand's** Computerworld New Zealand, PC World New Zealand; **Nigeria's** PC World Africa; **Norway's** Computerworld Norge, PC World Norge CAD/CAM, Macworld Norge; **People's Republic of China's** China Computerworld, China Computerworld Monthly; **Poland's** Computers; **Spain's** CIM World, Comunicaciones World, Computerworld Espana, PC World, Amiga World; **Sweden's** ComputerSweden, PC/Nyheter, Mikrodatorn, PC World, Macworld; **Switzerland's** Computerworld Schweiz; **Taiwan's** Computerworld Taiwan, PC World; **United Kingdom's** Graduate Computerworld, PC Business World, ICL Today, Lotus UK, Macworld U.K.; **United States'** Amiga World, CIO, Computerworld, Digital News, Federal Computer Week, GamePro, inCider, Infoworld, International Custom Publishing, Macworld, Network World, PC Games, PC World, Portable Computing, PC Resource, Publish!, Run, Sun Tech Journal; **USSR's** PC World USSR, Manager, PC Express, Network; **Venezuela's** Computerworld Venezuela, Micro Computerworld; **West Germany's** Computerwoche, Information Management, PC Woche, PC Welt, Amiga Welt, Macwelt.





CASE Is Another Area You Shouldn't Wander Into Without An Experienced Guide.



More than one IS manager has gotten lost in the labyrinth of CASE implementation.

That's why you need Index Technology—the world's most experienced CASE provider—to show you the way. As the developers of the Excelerator® Series, we've helped tens of thousands of users around the world map out successful CASE solutions.

What makes us different from the other CASE companies? Simple. At Index Technology, we don't just sell you a lot of flashy technology and then leave you in the dark.

Instead, we give you everything you need to make your CASE effort succeed—including proven technology, adaptable products, and an array of

support services rated the best in the business. We show you how to get results, then stay by your side to make sure that you do.

Over the years, that total-solution approach has earned us the trust of our customers. Including IBM, our biggest customer of all. In fact, IBM has so much confidence in us, it's purchasing an additional 2250 copies of our Excelerator products for its own use worldwide.

So it's no wonder that IBM is marketing our Excelerator Series as part of its own AD/Cycle™ offering. Or that IBM is relying on our advice in designing the Repository's information model. Which means our customers never have to worry where their CASE investment will lead.

The fact is, we have so much faith

in our CASE solution, we encourage 60-day product trials. We're the only CASE vendor who does. We think that says a lot about us—and even more about our competition.

But don't take our word for it. Call us for details on actual CASE success stories, and find out what our customers have to say. Then try the same thing with our competitors.

Once you do, we think you'll agree: It's safer going into CASE with someone who's been there many times before.

Index Technology Corporation,
One Main Street, Cambridge, MA 02142,
1-800-777-8858.

Index Technology

There's No Substitute For Experience.



Excelerator is a registered trademark of Index Technology Corporation. IBM is a registered trademark and AD/Cycle is a trademark of International Business Machines Corporation.

TRENDLINES

TECHNOLOGY TRANSFER

CAN I BORROW YOUR TURRET LATHE?

If cooperation is an absolute necessity for economic vitality, the setting is ripe for a "shared factory" to open in an industrial park near you.

Shared factories are manufacturing centers where small to medium-sized companies can get a firsthand look at the

latest in CIM and automated technology. According to Ted Lettes of the U.S. Department of Commerce, the centers were conceived with three scenarios in mind: companies that are trying to determine whether automation will fit their needs; companies that have already decided to invest in automation and want to train their employees; or companies that want to lease the equipment to supplement their internal production capacity.

Only one center, located in Meadville, Pa., is fully operational at the present time; 17 others are in various stages of planning, however. Lettes predicts that four centers—replete with robotics, automated guided vehicles and materials-handling equipment—will be up and running by the

end of the year.

At the moment, the Department of Commerce is offering only moral support, in the form of "networking and facilitating," said Lettes. Each center will be designed and funded by a variety of sources, most likely a consortium of businesses, universities, and state and local economic-development agencies.

While the federal government hasn't put our money behind the idea yet, there are some in Washington who believe that shared factories can help lift American manufacturing out of the doldrums. Leo Reddy, president of the National Coalition for Advanced Manufacturing, a lobbying group committed to the ambitious prospect of "completely modernizing the industrial infrastructure," believes that shared factories are an excellent way of introducing state-of-the-art technologies to companies that otherwise couldn't afford them.

"In Japan, you'll find a lot more CIM and automation in

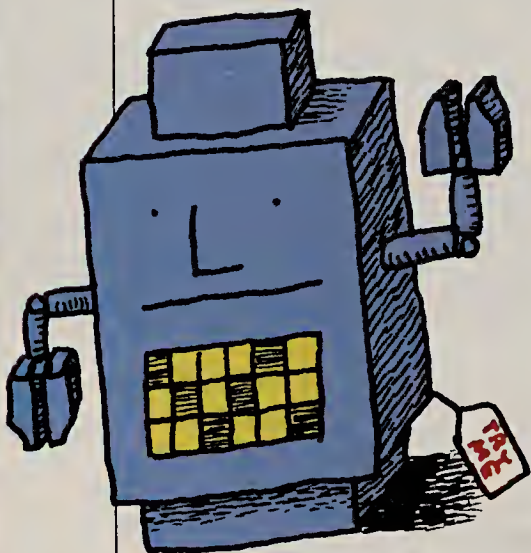
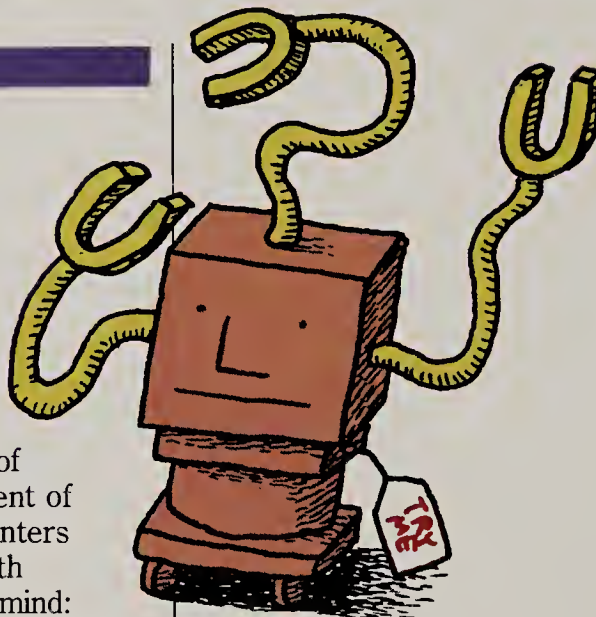
FRENCH MYTHOLOGY

Now that we've all grown tired of the CIO title controversy, the French have coined a new term for the hybrid business/technology executive: "Infotaur," which owes its inspiration to the Minotaur, the half-man, half-bull creature of Greek mythology.

According to the April issue of *Across The Board*, a publication of the New York-based business-research firm The Conference Board, a new French business school in Antibes, called the Theseus Institute, is dedicated to turning out infotours—a new breed of MBA "who speaks both languages—strategy and technology."

Apparently this bilingualism is even rarer in France than it is here. The article quotes the director of the Theseus Institute, Thierry Zylberberg, opining that "perhaps only one or two large companies in France have people on their boards of directors who understand both management and computer networks."

smaller firms than there is here," Reddy said. "If we don't start modernizing and sharing our resources with our smaller companies, we can forget about competing or even catching up."



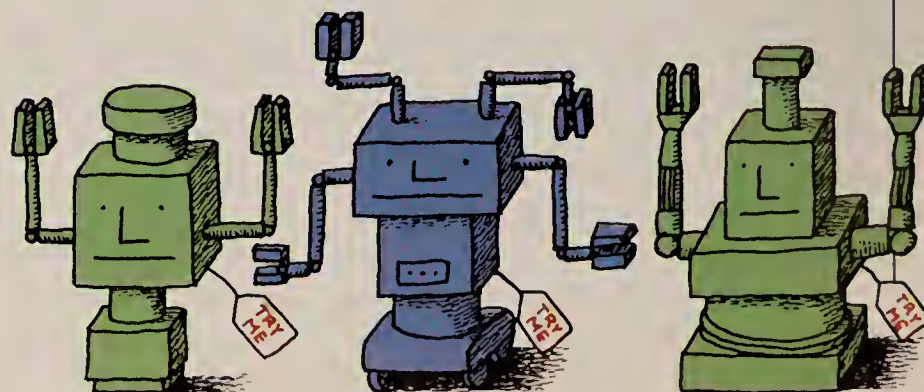
OUT-OF-JOINT VENTURES

Just when you thought it was safe to go back to your computer terminal (or maybe you didn't), a recent survey suggests otherwise. According to the Data Entry Management Association (DEMA), of Norwalk, Conn., 27 percent of the managers who responded to their 1990 VDT Health Survey have employees in their departments who suffer from repetitive-stress injuries.

Painful necks (57 percent) and blurred vision (33 percent) lead the list of physical ailments among the 317 operators and clerical workers profiled in the survey. Other common complaints include stiff arms and backs, burning eyes, and fatigue.

Remedies for common complaints range from using glare screens and thinner keyboards to implementing exercise programs and job rotation.

DEMA is a nonprofit educational association of data managers. In addition to conducting annual health surveys, DEMA also sponsors conferences concerned with issues affecting both traditional and emerging methods of data entry.





August 1990

"The information technology all around them is changing the way managers execute policy -- whether or not they have ever touched a keyboard."

John F. Rockart, Director
Center for Information Systems Research
Massachusetts Institute of Technology

Dear Executive:

IT's important. Organizations invest over several hundred billion dollars per year in IT. If IT were a country, it would be among the 50 largest in the world. IT is larger than the federal deficit, the Defense Department budget and total U.S. spending for education. IT permeates every facet of life and affects every decision that we make. IT is the single most important weapon in the race to succeed in the 1990s. IT is, naturally, information systems and services.

Timeliness and sophistication -- that's what senior management will demand of their information systems in the decade ahead. How much market share would we gain if we cut prices by 12%? What are the financial implications if we open a hundred new outlets? These are just a couple of questions that would be almost impossible to answer without IT.

One thing is obvious: Management's need for information has never been greater. It is imperative to have access to the right information at the right time and most important, the means to analyze and digest it.

This, our third annual CIO 100 issue salutes you -- America's information leaders. I hope you will enjoy reading it and every issue to come.

I'm looking forward to seeing you at our Fall Conference in Palm Springs, October 28-30, 1990. For more information, please call Lori Cardarelli at (508) 935-4631 or Diane Martin at (508) 935-4274.

As always, I would appreciate hearing your comments, suggestions and ideas for future issues.

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph L. Levy".

Joseph L. Levy
President and Publisher

Coming in CIO

Global Networks

Competing in the global marketplace is still a dream for many companies. *CIO* explores what it takes to make that dream a reality.

The Ties that Bind

Forward-looking companies are using IT to improve customer services and relationships—and, consequently, to lock in business.

Strategic Alliances

Eligible CIOs receive many vendor proposals in the course of their careers. *CIO* considers how to know when to say 'I do.'

Open Systems Update

What's new on the standards front? Have vendors accepted the inevitability of open systems? Are they working with user groups to achieve true interoperability? And what about Unix? Stay tuned for some exciting conclusions. . . .

TRENDLINES

MARKETING

MANAGING MODERN RELATIONSHIPS

More flash doesn't seem to get attention anymore from consumers jaded by the clutter and annoyed by the intensity of modern marketing efforts. But a detailed knowledge of purchaser needs and desires could help businesses break through the muddle, according to Jonathan R. Copulsky, of the consulting firm Booz-Allen & Hamilton in New York. "Advertisers need ways to make consumers more receptive to their claims [and] to establish a continuing dialogue with each individual consumer," he said.

What Copulsky is advocating is relationship marketing, which Booz-Allen defines as developing an ongoing relationship with consumers, potentially across a family of related products and services. "The intention is . . . to establish a continuing dialogue with each individual consumer . . . and reinforce product choices rather than effect short-term changes in behavior," he said.

Much of the foundation for that approach rests on the use of advanced information technology.

The first step for the budding relationship marketer is to build a file of current and potential customers. This usually means using a relational database, so that lists of customers for specific efforts can be as refined as possible. The database should also be cross-referenced with whatever demographic, lifestyle and purchasing information is available.

Once that database is in place, then it must be used to create lists to deliver what Booz-Allen calls "differentiated messages"—those de-

signed to speak directly to individual consumers' or homogeneous groups of consumers' characteristics and preferences.

Finally, the database will help the marketer track the relationship over time. In this way, the cost of acquiring and maintaining the data can be monitored and compared to the "lifetime value" of the consumers' purchases.

In addition to relational databases, there are several important information technologies that support relationship marketing. One is supermarket checkout-line scanners, especially those that can be used to identify and record an

DATA DICTIONARY

MARTIN LIFGREN, assistant vice president in the Transaction Processing Unit of the Apple Bank for Savings in Scarsdale, N.Y., wrote to us early in the year to suggest a jargon term for inclusion in our sporadically compiled rogues' gallery of mystifying language. Lifgren nominated "state of the art," which he artfully defined as any "system or software that you don't have."

What we don't have are any more terms to define; send your candidates to "Data Dictionary," CIO, P.O. Box 9208, Framingham, Mass. 01701. ■

individual's purchases to track their buying habits. For example, consumers who enroll in some frequent-shopper incentive programs provide a veritable gold mine of data for researchers.

New developments in telecommunications technology have provided another boost for this type of marketing, Copulsky said. Automatic number identification and voice re-

sponse equipment "make easy data capture and higher call volumes possible."

"With the ultimate aim of increasing customer usage over time," he continued, "relationship marketing becomes a personalized form of communication which crosses the previous boundaries between general advertising, sales promotion, [direct marketing] and public relations." ■

MIS MANNERS

Just because you've climbed the IS ladder to that incredibly posh CIO job doesn't mean you couldn't still use a bit of what used to be called "finishing." According to Washington-area etiquette consultant Cynthia Wein, even the most fulfilled executive should heed the words of Oscar Wilde: "The world was my oyster, but I used the wrong fork."

Wein specializes in making sure executives know an oyster fork from a pastry fork, as well as other niceties of social conduct the lack of which can, at the very least, be an anxiety-producing distraction in certain business situations. After all, says Wein, you want to be free to concentrate on what's truly important rather than fretting about your boorish manners.

Wein teaches half-day seminars on business and social etiquette and entertaining. Topics cover such class-consciousness benchmarks as receiving-line behavior, how to properly and gracefully introduce people (one of the most important acts in business life), and how to finesse a power lunch.

Said Wein: "If you want that job, you have to be technically sound, but you also have to have your act

together as a person—and that means something as basic as good manners."

Wein can be reached at Wein-Hitlin and Co., in Kensington, Md., 202 785-3540. If you call, try to be polite. ■



ILLUSTRATION BY BETHANY GULLY

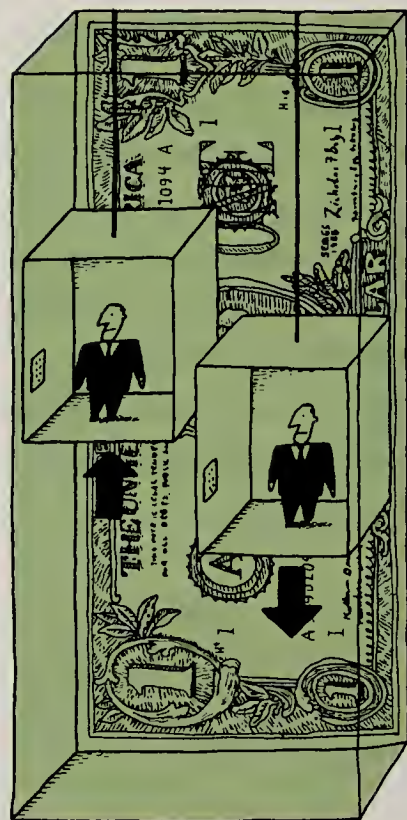
TRENDLINES

SURVEYS

THE PEAKS AND VALLEYS OF IS-LAND

Two recent IS pulse-takings suggest that the upward trend of IS executive salaries may be somewhat at cross-purposes with the imperative at many companies to trim IS costs across the board.

According to an annual compensation survey conducted by Edward Perlin Associates Inc., a New York-based management consulting firm that specializes in compensation issues, total aggregate compensation for top IS executives rose a healthy 9.4



percent this year. Three job categories, however, won whopping raises of 25 percent or more.

If you're a "database development and administration

head" (25 percent), "systems planning and architecture head" (28 percent) or "disaster recovery services head" (35 percent), your ship came in in 1990.

Not coincidentally, these are all areas of fast-growing or already-intense concern to most IT-reliant enterprises. Not surprisingly, also garnering higher-than-average raises were executives responsible for overseeing systems-integration efforts (19 percent).

On the other side of the ledger, a survey of IS directors at 54 banking, brokerage and diversified financial-services companies shows that cost containment is now the main focus of half the respondents.

The telephone survey, which was conducted by John J. Davis & Associates Inc., a New York-based executive-search firm that specializes in IS management, also ranked

productivity improvement as the top priority of 30 percent of the respondents.

These economy-minded goals reflect "the pressure that most financial-services institutions are under," said company President John J. Davis. The survey also identified a corresponding de-emphasis of new applications and staff development, according to Davis.

Other findings: Half the companies polled have either a CIO or its functional equivalent; 90 percent of the IS groups create a formal annual business plan. ■

CAREER MOVES

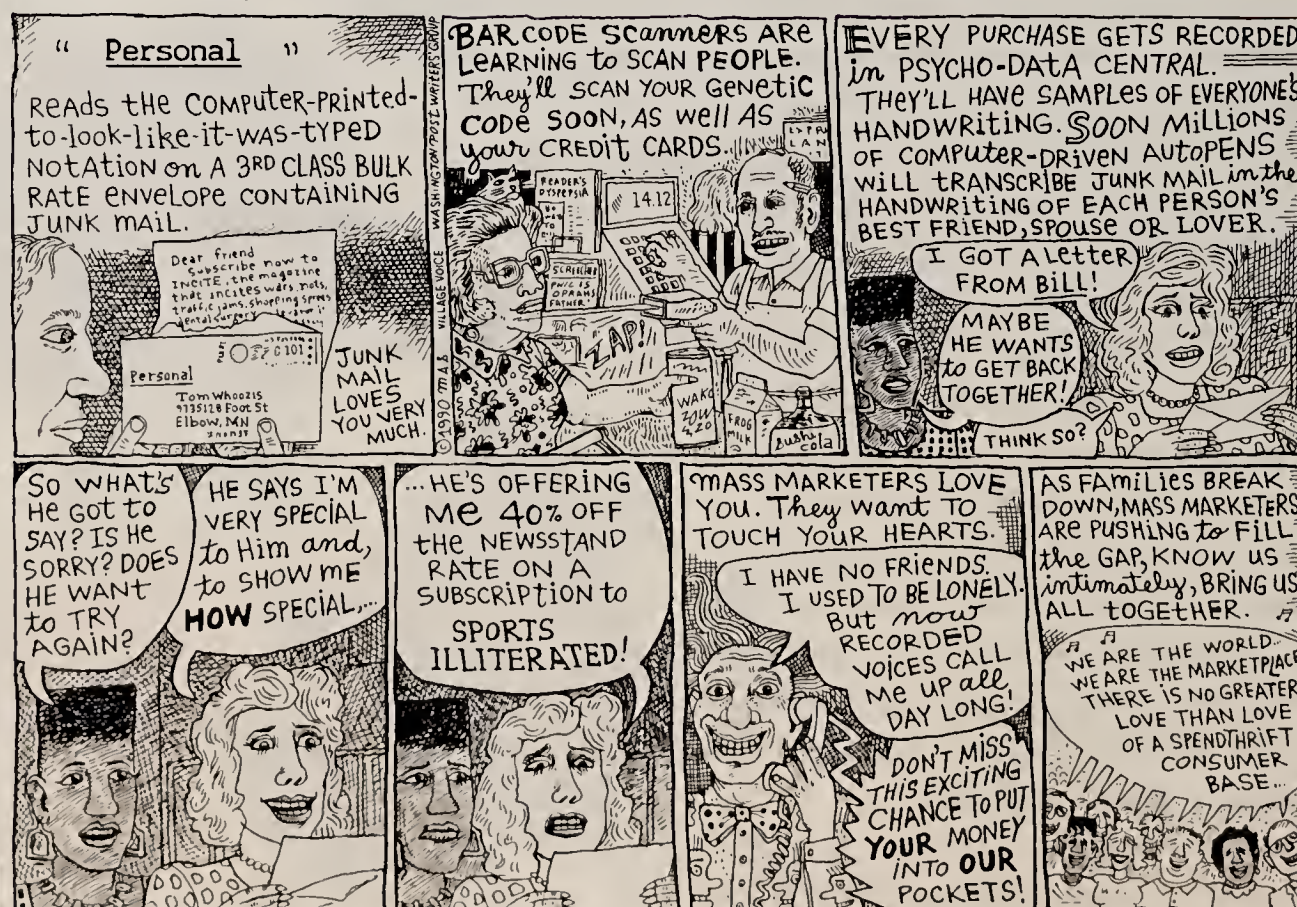
G. NICHOLS (Nick) SIMONDS has left Chrysler, where he was executive director of MIS, to become vice president of information systems at Honeywell Inc. in Minneapolis. In his new job, Simonds will oversee corporatewide planning and implementation of systems technology and applications, computer operations and support services, and telecommunications. He will report to Honeywell's CFO, **CHRISTOPHER J. STEFFEN**. Simonds replaces **IRMA M. WYMAN**, who retired in April.

LAURENCE J. BEST has joined American Management Systems Inc. of Arlington, Va., an information technology consulting and systems integration firm, as a principal. Best is an authority on application architecture (see "Bricks and Mortar," *CIO*, April 1990) and the author of a seminal book on the topic. Application architecture is a systematic approach to identifying and replicating the elements common to excellent applications. ■

ULTIMATE JUNK MAIL

WASHINGTON. Mark Alan Stamaty

Syndicated cartoonist Mark Alan Stamaty discovers that Big Brother ultimately wound up in marketing, not government. ■





*Due to a software error at the credit card company,
the power lunch is now in hot water*

Software problems can be embarrassing. Fortunately, tools to build better software are now available from IBM and its business partners. KnowledgeWare is the industry leader in Computer Aided Software Engineering (CASE) tools and technologies. And our close relationship with IBM makes us the natural choice of IBM users.

For more information on KnowledgeWare CASE tools, call 1-800-338-4130. KnowledgeWare, Inc., 3340 Peachtree Road N.E., Atlanta, GA 30326.



KnowledgeWare®

The World's Most Comprehensive CASE Tool Set™





Where do information technology
and innovation intersect?
Just about everywhere . . .

THE CREATIVE PROCESS

BY ALLAN E. ALTER

“WE ALL BALLYHOO about technology making the great competitive edge. Is that the reality? Or are we just smoking it?”

David Binko, Johns Hopkins University's director of academic computing, threw this tough-minded question at me back in February. We were speaking about the roundtable on communications for

CIO's May issue. But before we hung up, I asked Binko about the upcoming CIO-100 issue. Our top 100 is not a definitive list, I explained, but an occasion to conduct an inquiry—and every year we conduct a new one. Last year we asked a panel of experts to select the 100 companies that were most innovative at using information technology within specified industries. What did he think should be our subject in 1990?

Get to the root of the IT-innovation relationship, was Binko's advice. First he suggested that we select a “guru panel” to provide us with a list of 100 innovative companies—not innovative in technology, but innovative as busi-

INDEX TO INNOVATION CATEGORIES

MANAGING INNOVATION
Page 57

BEING BIG, ACTING SMALL
Page 63

SPEED TO MARKET
Page 67

SHARING INFORMATION
Page 71

KNOWING THE MARKET
Page 75

CUSTOMER SERVICE
Page 79

QUALITY
Page 83

PRODUCT DEVELOPMENT
Page 87

INNOVATION IN JAPAN
Page 91

nesses. "Then look at how IS has made a difference, how it has played a role in being innovative in their market," he said. "That would be interesting."

We thought so too. Thus began one of the most ambitious editorial projects in our three-year history: to uncover the relationship between IT and innovation. Is the link for real? How do companies use IT to be innovative? What is the CIO's role in corporate innovation?

We began by polling leading academic experts, consultants, journalists and government officials from around the world on innovation. In nearly all cases, these were not experts on IT, but people who devote much of their time to studying and advising on innovation. We first asked them to define innovation, and we consolidated their answers into a single definition (see box). Next we polled them to create our list of the 100 companies. Whether or not they used information technology was unimportant, we stressed. We wanted to know which businesses and institutions they considered to be the most innovative in the world. We then assigned a team of researchers to explore with the CIOs of these organizations the link between IT and innovation.

What did we find? That the link between IT and innovation is real.

INNOVATION DEFINED

An innovative enterprise does one or more of the following:

- ▶ *creates new products and services that are successful in the marketplace;*
- ▶ *refines, redefines and improves existing products and services so that they remain successful in the marketplace;*
- ▶ *creates and refines internal processes (production systems, delivery systems) that enable it to stay successful in the marketplace.*

All innovative enterprises also:

- ▶ *have commercially successful products or services;*
- ▶ *create, through management, an organization that is capable of continually renewing and improving its products, services and processes;*
- ▶ *retain these qualities over time (they may do so by continually building the company's knowledge base, enhancing its technological capacity, and maintaining its capacity for continual renewal);*
- ▶ *experiment and take risks.*

Innovation is not:

- ▶ *restricted to developing a new product—that's invention;*
- ▶ *simply having good ideas—that's creativity;*
- ▶ *a one-time commercial success or recent corporate turnaround.*

Innovators do not have to:

- ▶ *invent every new idea in-house—innovators can take ideas from others and implement them.*

In nearly all of the 100 companies, information technology has become more than a useful tool for carrying out specific tasks; it is an integral part of the organization's way of life. Perhaps Carl A. Kuhrmeyer, 3M's vice president of administration, said it best: At most innovative companies, IT is "enabling innovation to occur easily and naturally." This month's articles explore how and why these firms use technology to enable innovation.

At the heart of the issue are the nine essays on innovation. Rather than cover an industry or a technol-

ogy, each essay explores a way in which companies achieve innovation (for example, by providing customers with better service), and how IT enables that approach. (The essay focusing on innovation in Japan is an exception to this format.) Each essay is

CIOs say IT's top contributions to innovation are in enhancing internal and external communication, helping companies know and serve their customers better, and helping them improve operational processes.

accompanied by a short profile spotlighting a company that has proven itself to be particularly effective in that respect.

Readers will find 21 companies from last year's CIO-100 issue, which measured innovation in using IT. The 1990 edition includes both companies where IT is critical to innovation and others where it is not regarded as especially important. It's worth noting that while last year's panel of IT experts did not select the computer industry as innovative users of IT, this year's experts on innovation cited many well-known computer vendors. And while in previous editions we only examined American companies, this year we turned our attention abroad and include 13 Japanese corporations and 11 European firms. (Japanese companies have been addressed together in a separate category for logistical reasons. A correspondent based in Japan researched and interviewed the companies cited, and the writers of our topical essays did not have direct ac-

WHERE THE CIO STANDS

WHO THE CIO REPORTS TO*

CEO



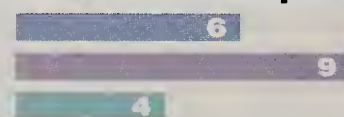
Executive/Senior VP



CFO



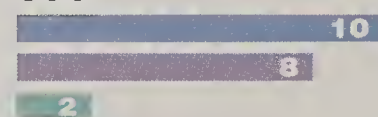
Division or Group Head



VP



COO



Vice Chair



1990

Total mentions: 72

1989

Total mentions: 90

1988

Total mentions: 76

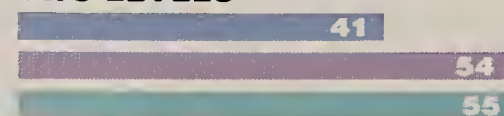
*By number of mentions

LEVELS BELOW THE CEO*

ONE LEVEL



TWO LEVELS



THREE LEVELS



1990

Total mentions: 69

1989

Total mentions: 89

1988

Total mentions: 79

*By number of mentions

CIOs WHO REPORT TO THE CEO:

American President:

James S. Marston

Banc One: David Van Lear

BellSouth: Don E. Daniels

Boeing: Arthur Hitsman

British Airways: John Watson

Covia: Mark Teflian

Kimberly-Clark: John T. Kohler

Mrs. Fields: Paul Quinn

New England Medical Center:

Jeffery Tarte

Spire: Robert D. Evans

Thomson: Brian Eatock

Toshiba: Kohi Okamoto

U.S. Army Health Services Command:

Richard J. Strachan

United Services Automobile Assoc.:

Donald R. Lasher

THE IT/INNOVATION LINK

THE IMPORTANCE OF IT

Q: *In your company, how important a role overall does information technology play in innovation?*

- **Extremely important** (50)
- **Important** (22)
- **Somewhat important** (6)
- **Not important** (0)

Number of respondents: 78

IT CONTRIBUTIONS

Q: *In which ways does IT play a role in innovation?*

- **Providing superior customer service** (62)
- **Communications within the corporation** (61)
- **Continual improvement efforts** (59)
- **Knowledge about customers** (57)
- **Management of development process** (51)
- **Quality** (50)
- **Individual creativity** (46)
- **Speedy product/service development** (39)
- **Manufacturing capabilities** (38)
- **Research** (37)
- **Managing organizational change** (34)
- **Finding and creating new markets** (29)
- **Individual entre- and intrapreneurship** (25)
- **Other** (5)

Number of respondents contributing to above figures: 73. Four additional companies responded "most of the above"—making the total number of respondents 77.

CIO CONTRIBUTIONS

Q: *What do you as CIO expect to do to help your company remain innovative?*

- **Evaluate and deploy appropriate new technology** (15)
- **Align IS with the business** (12)
- **Make information rapidly available** (11)
- **Provide IT leadership, vision and inspiration** (11)
- **Provide a communications infrastructure** (10)
- **Gain competitive advantages through IT** (10)
- **Use IT to provide superior service to the customer** (8)
- **Establish an IT architecture and standards** (7)
- **Work with and educate other senior executives** (7)
- **Educate and train users about IT** (6)
- **Improve the IS organization** (6)
- **Provide tools for knowledge workers** (6)
- **Integrate systems** (6)
- **Create and implement an IS strategic plan that supports the business** (5)
- **Strengthen IS links with users** (4)
- **Use IT to empower employees** (4)
- **Institute distributed processing** (3)
- **Provide support for IT efforts by divisions and business units** (3)
- **Provide cost-effective IS services** (3)
- **Re-engineer and simplify business processes** (2)
- **Build systems for human-resource management** (2)
- **Apply IT for employee productivity** (2)
- **Provide end-user systems tools** (2)
- **Foster organizational change** (2)
- **Misc.** (18)

Number of respondents: 66

cess to either the companies or our correspondent.)

In addition to the company profiles that accompany each essay, we thought it would benefit readers to take an in-depth look at the overall IT-innovation connection at a single company. No other organization won as many votes from our innovation experts as 3M, so we approached Kuhrmeyer. The result, thanks to freelance writer David Freedman, Kuhrmeyer and other 3M officials, is a close-up look at the connection be-

tween information technology and 3M's renowned innovation-fostering corporate culture.

While the theme of the CIO 100 may change every year, two things remain constant. First, we always include an interview with a well-known, influential business thinker. This year, we offer the new editor of the *Harvard Business Review*, Rosabeth Moss Kanter. Dr. Kanter has made her reputation investigating and explaining how innovation really works inside corporations. She shares her

MAKING A LIST

insights into what makes innovation click, and how CIOs and IS departments can contribute to innovation.

Second, we have distilled information gathered from the CIO-100 companies into chart form. We again feature data on the CIOs at these companies; budget and staffing figures; and the popular vendors and consultants.

This year, we've added charts on the IT-innovation link. They reveal that nearly two out of every three CIOs regard IT to be extremely important to innovation at their companies (a claim that they backed up with some pretty convincing evidence). The majority of CIOs also agree on

THREE-TIME CIO-100 WINNERS

American Airlines Inc. (Max D. Hopper)
The Boeing Co.
Citicorp
Covia
Ford Motor Co. (S.I. Gilman)
The Procter & Gamble Co.
 (Robert J. Herbold)
Wal-Mart Stores Inc.
 (Bob L. Martin)

DOUBLE WINNERS (1989 & 1990)

American President Companies Ltd.
 (James S. Marston)
Banc One Corp.
BellSouth Corp. (Don E. Daniels)
Federal Express Corp. (Ron Ponder)
Frito-Lay Inc. (Charles S. Feld)
Johnson & Johnson
 (Raymond L. Giovannelli)
L.L. Bean Inc. (Horace Gower)
Levi Strauss & Co. (Bill Eaton)
MCI Communications Corp.
 (Allan Ditchfield)
Merck & Co. Inc. (A.C. Cinorre)
Milliken & Co.
Motorola Inc.
Mrs. Fields Inc. (Paul Quinn)
United Services Automobile Assoc.
 (Donald R. Lasher)

Names of CIOs are given only when the same executive has held the position during the years under consideration.

There is, and can be, no "objective" numerical formula for rating innovation. To select this year's CIO 100, we used two methods: Companies were voted onto the list by a panel of innovation experts, or they earned inclusion by being recognized for innovation by specific awards committees or magazines.

Eighty-three companies were voted onto our list. Our panel of innovation experts included academics, consultants, journalists and government officials who specialize in innovation (see Page 94 for a full listing). They used our definition of innovation as their yardstick.

In order to include as many different kinds of organizations as possible, we sought experts and sources with knowledge of foreign companies, small businesses, the health-care industry, not-for-profit organizations, education and government. We found, however, that experts in these last three sectors could not agree on what constituted an innovative organization in their fields. Thus we reluctantly are unable to include any schools, government agencies or not-for-profit organizations (except in health care) in this year's CIO 100.

Winners were chosen in two rounds of voting. In the first round, our panel was asked to name companies independently, without choosing from a list of nominees. Only 10 companies (3M, Federal Express, Flow International, Ford, Hewlett-Packard, Intel, Merck, Motorola, Rubbermaid, and Wal-Mart) were named by at least three panelists—the minimum necessary for selection in this open round.

In the second round, panelists were given a list of nominees to choose from. This list included companies that had been mentioned by someone in the first round as well as companies that were specifically cited for innovation in *Business Week's* 1989 "Innovation in America" Issue. CIO's editors also offered as

nominees several companies whose innovative practices had been described in past issues of *CIO*. Panelists voted for or against inclusion of these nominees. Companies that won more yes votes than no votes were added to the CIO-100 list.

The remaining 17 CIO-100 winners had previously been recognized for innovation by selected awards committees or magazines. Four of the companies—Globe Metallurgical, Milliken, a division of Westinghouse and Xerox—had won the U.S. Commerce Department's Baldrige award for quality. Four health-care organizations—White Memorial Medical Center, St. Joseph Health System, Blue Cross and Blue Shield of Minnesota, and the U.S. Army Health Services Command—won the 1990 Organizational Innovators' Award given by 3M and The Healthcare Forum, a national educational association for health-care leaders based in San Francisco.

Nine companies were specifically cited for innovation on two other magazine lists: *Inc.* magazine's "Entrepreneur of the Year" awards (January 1990), and *Fortune's* "Most Admired Companies" list (January 20, 1990). Mercury Stainless, Stew Leonard's and Thermo Electron were named by *Inc.*; *Fortune* cited Bell-South, Corning, Gillette, Kimberly-Clark, Procter & Gamble and Reynolds Metals.

Six of the 10 companies that made the CIO 100 in the first round of voting had also won recognition elsewhere: Motorola is a Baldrige award winner, and 3M, Ford, Merck, Rubbermaid and Wal-Mart were included on *Fortune's* list of "most admired" companies.

As is inevitable with any list chosen by a panel, there are deserving companies that did not make the CIO 100. We do not claim that this is a definitive list. We are confident, however, that the organizations that are included have earned the honor of being placed among the most innovative enterprises in the world.

IS customers are up in arms. IS costs are out of control. The CEO wants to outsource.

It wasn't that long ago when the CEO didn't know what "outsourcing" meant. Let alone what IS was doing. Well, all that's history. Because today, you're under increasing pressure to control costs *and* keep customers happy.

There's never been a better time to be an IS executive. To respond, you must simultaneously manage heterogeneous computing and network configurations, contain

and reduce IS costs, manage IS customer expectations, and capitalize on rapidly changing conditions. To do all this, you need accurate, timely, integrated information on costs, workloads and service levels. In other words, you need MICS from LEGENT.

MICS is the *only* comprehensive management solution available to IS executives. It's designed to measure and report on *all* aspects of your IS operation, allowing you to document the efficiency and effectiveness of your department. MICS also lets you compare the costs and performance of outside vendors to the in-house organization, so you're better prepared to respond to any outsourcing initiatives.

Remember, only MICS can provide the integrated IS management information you need to prosper in these tough times. To learn more, call your LEGENT account representative or call 1-800-877-8678.

MICS IS Management Support System

LEGENT

MOST POPULAR HARDWARE VENDORS*

IBM (62)	Amdahl (9)	Wang (5)	Acer (2)
Digital (39)	Toshiba (8)	AST (3)	GRiD (2)
Compaq (20)	NCR (6)	Hitachi (3)	Tandem (2)
HP (20)	Unisys (6)	NEC (3)	Xerox (2)
Apple (19)	Apollo (5)	Olivetti (3)	
Sun (17)	Cray (5)	Zenith (3)	

*By number of mentions. Includes mainframes, minis, PCs, workstations and laptops.

MOST POPULAR SOFTWARE VENDORS*

IBM (28)	Oracle (8)	Software AG (3)
Lotus (21)	MSA (6)	Unisys (3)
Microsoft (17)	ASK (5)	Comshare (2)
Computer Assoc. (16)	AT&T (4)	Dun & Bradstreet (2)
Digital (11)	Pansophic (4)	HP (2)
WordPerfect (9)	Ashton-Tate (3)	KnowledgeWare (2)
	Novell (3)	Meditech (2)

*By number of mentions. Includes software for mainframes, minis, PCs, workstations and laptops.

MOST POPULAR COMMUNICATIONS AND NETWORKING VENDORS*

AT&T (41)	HP (3)	Williams (3)
IBM (16)	Northern Telecom (3)	Motorola (2)
MCI (16)	Nynex (3)	Racal-Milgo (2)
Digital (10)	Pacific Bell (3)	Rolm (2)
US Sprint (10)	Southwestern Bell (3)	Stratacom (2)
GTE (4)	Telenet (3)	Sun (2)
3COM (3)	US West (3)	Synoptics (2)
Banyan (3)		Timeplex (2)

*By number of mentions. Includes telephone companies, network services, and communications/networking hardware, WAN and LAN vendors.

MOST POPULAR CONSULTING ORGANIZATIONS*

Andersen (12)	Gartner Group (3)
Index Group (10)	Price Waterhouse (3)
Ernst & Young (7)	Coopers & Lybrand (2)
IBM (4)	CAP Gemini (2)
Digital (4)	James Martin Associates (2)

*By number of mentions. Includes consulting firms, systems integrators, vendors, etc.

the ways in which IT contributes most to innovation: It enables communication; helps companies better understand (and serve) customers; and helps companies to continually improve their internal processes.

However, CIOs seem to have little in common when they describe their own roles in helping their companies

Despite wide agreement on the role IT plays in assisting innovation, CIOs showed much less unanimity in expressing their own agendas, perhaps reflecting some uncertainty over their place in the innovation process.

remain innovative. The most common response—best summarized as “to evaluate and deploy appropriate technology”—was given by only 20 percent of the respondents.

Some answers baffle us. While 60 CIOs said communications were an important way IT contributes to innovation, only 10 said they needed to “provide a communications infrastructure” to help their companies remain innovative. Perhaps these CIOs are satisfied with the networks they have established. But considering how quickly this complex field is changing, CIOs probably feel their communications infrastructures need to be continually built, rebuilt and improved. Most likely, these scatter-shot answers indicate that CIOs are still unsure of how they fit into corporate innovation.

If innovation is going to be as important in the 1990s as Kanter says, CIOs will need to think this through. We hope this year’s CIO-100 issue will be of help. ☐

100

Oracle Financials keep Burlington Coat comfortable year-round.



"We were dying under the weight of obsolete computing. We needed an integrated financial system with a user interface that wouldn't cause a mutiny. Not only did Oracle Financials deliver over one million invoice transactions this season, but it delivered a 100% happy user base."

Bob LaPenta, Controller and Chief Accounting Officer, Burlington Coat Factory

With over 150 stores around the country, Burlington Coat's biggest sales job was internal. Even though they had an impossible-to-maintain, home-grown accounts payable, expenses and general ledger system, their employees knew how to use it. They knew the work-arounds and the pitfalls. They also knew the 1989 buying season would be a nightmare. So they were willing to give the Oracle Financials™ family of products a close look.

The intuitive screens impressed them immediately, because Oracle Payables had a familiar feel. But they were literally rescued by the ability to modify vendor information on the fly. For example, their suppliers may have financed production with multiple lenders, or factors, who needed to be paid directly. Burlington's old system made this a continuous but necessary nightmare of over-time, workarounds and manual entries.

Oracle Payables completely eliminated this headache.

A successful season and a million invoices later, Burlington Coat keeps their business warm with Oracle Financials.

Find out how the complete suite of Oracle Financials products—Oracle General Ledger, Oracle Purchasing, Oracle Payroll, Oracle Assets, Oracle Receivables, Oracle Revenue Accounting, Oracle Inventory, Oracle Order Entry, Oracle Sales Analysis, Oracle Payroll, Oracle Personnel, Oracle Alert—can keep your business out of the cold. They're so easy to learn and use, you can probably use our documentation to warm your own house.

ORACLE®

Call 1-800-ORACLE1, ext. 9695 today, to schedule a demonstration of Oracle Financials. The experience will be a profitable one for you.

Oracle Financials

U.S. SEMINARS

AR	Little Rock	Aug 7
AZ	Phoenix	Jul 24f Jul 24
	Sierra Vista	Jul 19c Jul 19
	Tucson	Aug 7f Aug 7
CA	La Jolla	Aug 2c Aug 2
	Los Angeles	Jul 31f Jul 31
	Newport Beach	Jul 31f Aug 21f Aug 21
		Jul 17f Jul 17
		Aug 16c Aug 16
	Riverside	Jul 12f Jul 12
	Sacramento	Jul 26f Jul 26
	San Diego	Jul 17f Jul 17
		Jul 19f Jul 19
	San Francisco	Jul 12c Jul 12
		Aug 9f Aug 9f
	Santa Clara	Jul 18 Jul 18f
		Aug 17c Aug 17f
CO	Denver	Jul 19f Jul 19
CT	Stamford	Jul 24f Jul 24
DC	Washington	Jul 24c Jul 24
		Aug 7 Aug 21 Aug 21s
FL	Jacksonville	Jul 19f Jul 19
	Melborne	Aug 16c Aug 16
	Miami	Aug 14 Aug 14f
	Tampa	Jul 13f Jul 13
GA	Atlanta	Jul 10f Jul 10
IA	Des Moines	Aug 16c Aug 16
ID	Boise	Jul 26
IL	Chicago	Jul 17c Jul 17
		Aug 2f Aug 21 Aug 21f Aug 21f
IN	Ft. Wayne	Jul 24f Jul 24
	Indianapolis	Aug 1c Aug 1
KS	Wichita	Jul 10c Jul 10
KY	Louisville	Aug 23f Aug 23
LA	New Orleans	Aug 2c Aug 2
MA	Burlington	Jul 27f Jul 27
MD	Baltimore	Jul 19f Jul 19
MI	Dearborn	Aug 21f Aug 21
MN	Minneapolis	Jul 10c Jul 10
MO	Kansas City	Aug 2f Aug 2 Aug 14
	St. Louis	Jul 19f Jul 19 Aug 16
NJ	Iselin	Jul 10f Jul 10
		Aug 7c Aug 7
NM	Albuquerque	Jul 26f Jul 26
NV	Las Vegas	Aug 14
NY	Buffalo	Jul 24f Jul 24
	New York	Jul 11f Jul 11
		Jul 25c Jul 25c Jul 25 Jul 25f
		Aug 15 Aug 15f Aug 29 Aug 29f
	Syracuse	Jul 26f Jul 26
OH	Cincinnati	Jul 12
	Cleveland	Jul 5f Jul 5
	Columbus	Aug 16f Aug 16
OK	Oklahoma City	Jul 17c
		Jul 17 Jul 18f
	Tulsa	Jul 18 Jul 19f
PA	Allentown	Jul 17c Jul 17
	Harrisburg	Jul 19f Jul 19
	Malvern	Aug 21f Aug 21
	Pittsburgh	Aug 9c Aug 9
RI	Providence	Jul 12f Jul 12
SC	Greenville	Jul 18f Jul 18
TN	Memphis	Jul 17 Aug 23
	Nashville	Aug 7f Aug 7
TX	Austin	Aug 15f
	Dallas	Jul 10c Jul 10 Jul 11f
	Ft. Worth	Jul 24
	Houston	Jul 17f Jul 19
		Jul 19f Aug 21f
	San Antonio	Aug 3c
		Aug 3 Aug 16f
UT	Salt Lake City	Jul 17f Jul 17
		Aug 23c Aug 23
VA	Norfolk	Jul 31c Jul 31
	Reston	Jul 17f
WA	Bellevue	Jul 24f Jul 24
		Aug 23f Aug 23f
WI	Madison	Aug 15f Aug 15
	Milwaukee	Jul 18c Jul 18

Use the following key for identifying the special afternoon sessions that are offered with the seminar dates above.

c CASE/Application Tools
f Oracle Financials
l Oracle Mail
i IBM
e Educational Tutorial
s Secure Systems

Attn: National Seminar Coordinator
Oracle Corporation
20 Davis Drive
Belmont, California 94002
1-800-ORACLE1, ext. 9695

☐ My business card or letterhead is attached. Please enroll me in the FREE Oracle Financials seminar to be held.

at: _____

on: _____

CI O. MAGAZINE

THE COMPANY THAT INNOVATION BUILT

BY DAVID FREEDMAN



3M hasn't cornered the market on innovation, but sometimes it seems that way. The oft-told fable of Post-it Notes—a product dreamed up by an employee sick of losing bookmarks—epitomizes the challenges and potential pay-offs of nourishing risky ideas, even when they might seem off-the-wall. Scores of companies have tried to emulate 3M's culture, but it's a tough act to follow. 3M, based in St. Paul, Minn., boasts

some 60,000 products, ranging from Scotch tape to surgical staplers to electrically conductive foam—all to one degree or another tributes to the power of innovation.

But does any of this relate to information technology? 3M's fame, after all, is for creative product development, not for leading-edge information systems. Does information technology even play much of a role in the \$12 billion company's efforts to nourish and capitalize on innovation? Or, to look at it the other way around, does 3M's mania for innovation infect its IT efforts as well?

Whichever way you look at it, the answer seems to be a resounding yes. "Everything about innovation that applies anywhere in the company applies to IT as well," insists Carl A. Kuhrmeyer, 3M's vice president of administration, and as such the company's CIO. "We couldn't be competitive if that weren't true." And 3M

is nothing if not competitive, with an average 13 percent yearly growth in per-share earnings over the last five years. Its product introduction rate is staggering: A third of its revenues comes from products that were introduced in these same last five years.

3M hasn't always been a dynamo of creativity and profit. In fact, it was founded nearly a century ago on a mundane—and totally flawed—vision. The company was



WHEN THE ORIGINAL MINE
*of the Minnesota Mining and
Manufacturing Co. went
bust, 3M found another nat-
ural resource—the ideas of
its employees.*





KUHRMEYER: *A mutual commitment with its employees is key to 3M's success.*

supposed to make its fortune mining corundum, used as an abrasive in sandpaper, but the corundum mine its founders bought turned out to be corundumless (which at least explains why a company named Minnesota Mining and Manufacturing doesn't have anything to do with mining). In desperation, management turned to the employees and said, in effect: Innovate us out of this mess. One of them came through, inventing a waterproof sandpaper that was a smash hit (but only after he had first struck out with a facial sandpaper that was supposed to replace shaving). The company has been innovating like crazy ever since.

But being innovative brings its own unique set of challenges—especially if you're running the company's IT efforts. For one thing, 3M's concern about bogging down creativity in red tape has led the company to divide itself up into more than 60 different business units ranging in size from a few million to hundreds of millions of dollars in sales per year. These units spray products into hundreds of in-

"Everything about innovation that applies anywhere in the company applies to IT as well. We couldn't be competitive if that weren't true."

—Carl A. Kuhrmeyer

dustrial, service and consumer markets, most of which are moving targets. "I think customers' needs have changed more in the past five years than they did in the 30 years before that," said Kuhrmeyer.

To reflect the company structure and rate of change, 3M's IT efforts have emphasized decentralization and flexibility. "It's very difficult at this company to say anybody is running anything," noted Kuhrmeyer. But he

added that the importance of sharing information—especially at a company that prizes innovation—requires a certain amount of centralized planning and adherence to standards. "Continuity is important in IT," he said. "We want our people to feel independent and to do what they think is best for them, but we try to make sure that everyone's efforts fit into a corporate architecture."

That architecture is not one that is carved out at the company's St. Paul headquarters and then handed down as law to the business units. In true 3M style, it is an architecture developed by consensus. "We circulate drafts for every element, take input from around the world, and only publish it when everyone agrees," Kuhrmeyer explained.

Even then, he added, nobody is forced to comply with the standards. "If a unit wants to go off on its own against the standards, we just tell them to go ahead, as long as it isn't conflicting with one of our key strategies," he explained. "If there were a strategic issue and we thought it might adversely affect the entire company, then we'd put together a task force to look at the situation and come up with a recommendation. If the task force said the unit's idea was dumb, and the unit still wanted to go ahead with it, we might tell them we refused to support it—but we wouldn't stand in their way."

So far, it has all worked out very nicely. In addition to the vast array of applications maintained individually by the various units, 3M boasts several key companywide systems that tie critical aspects of the business together. Financial, human resource management, engineering project management and CAD/CAM data can all be swapped between units located anywhere in the world and then consolidated at headquarters.

AFTER 15 YEARS
IN THE COMPUTER BUSINESS,
TANDON OPENS 426 MILLION
LOCATIONS NATIONWIDE.

This sort of information sharing brings the company closer to achieving strategic goals like shrinking the time it takes to bring a product from the laboratory to the market. "We've cut a two-year cycle down to three to six months," Kuhrmeyer said. "There used to be lag time associated with every step in the process. Now our systems ensure that when someone in marketing asks for a product change, the right lab has the necessary information in seconds."

Integrated systems have also given marketing a boost. Several 3M business units typically sell different products to the same customer; now these units can share the information necessary to consolidate their efforts and win broader corporate accounts. "How many salespeople do you want calling on GM or Toyota?" asked Kuhrmeyer, noting that 3M sells large quantities of many types of products to car manufacturers. "Now we have an auto industry group that can share information on costs, inventory, and customer order histories." 3M is now expanding this application worldwide to provide better coverage of its multinational customers. "If GM is buying our product in Detroit, then they should be buying it in their factory in Frankfurt as well," he said.

This sort of worldwide integration also pays off in time and cost savings

"I don't want to restrict the growth of this department to my knowledge and abilities. . . . People here have direct input into what they do. No ideas are ignored."

—Richard Theis



achieved from eliminating the need to rekey manufacturing, distribution and marketing information. "When we buy chemicals and input the cost and quantity, we shouldn't have to input that data a second time when we process the chemicals."

But despite the advances 3M has made in companywide systems, Kuhrmeyer contends that most of the business units' key applications are developed locally rather than centrally—though if a unit develops what Kuhrmeyer considers to be a hot application, he'll see to it that the application is made available to other units. Corporate IT, for example, had been designing a sales-force productivity package when Kuhrmeyer discovered that a division was undertaking a similar effort. "We dropped our own effort in favor of theirs," he said. "Then we took the divisional people that came up with the idea and made them part of corporate staff, so that they could help others develop similar packages. Most of the good things around here come from the bottom up."

One 3M IT department that has produced its share of innovative applications is the one attached to the \$1 billion Health Care Group. One of 11 groups at 3M, each of which typically incorporates several divisions, the Health Care Group produces some 1,000 products, including prescription drugs, X-ray film and diaper closure adhesives. It has also been one of the fastest-growing groups at 3M, and its IT efforts reflect that growth clearly: The IT department was founded eight years ago with one person and now consists of more than 80 people.

The person who runs Health Care's IT department is Richard Theis—who also happens to be the person who comprised the entire department when it was founded. But Theis sees his department's efforts as anything but a one-man show. "I don't want to restrict the growth of this

WATERPROOF SANDPAPER and cellophane tape dispensers (above) established 3M as an innovator in the early '20s.



PHOTOGRAPHS COURTESY OF 3M

VISIT THE ONE NEAREST YOU.



When Tandon entered the computer business 15 years ago, most users only wanted price/performance. That's what we delivered. And today there are more than 600,000 Tandon systems installed worldwide.

Now state-of-the-art products aren't enough. You want a choice in how you purchase, service, and support your computers. So we're responding with the state-of-the-art in customer satisfaction. Now you can choose how you purchase and service your computers: direct from Tandon or through a Tandon business partner (resellers/dealers).

Either way, you get outstanding Tandon systems featuring innovative Tandon technology. Robust, reliable, price-competitive computers that have made Tandon's 5-year sales growth greater than even Compaq and Apple. Technologically advanced computers that lead the industry in power and performance. Computers that must pass stringent manufacturing and quality checks before they wear the Tandon label.

And you choose the level of service and support that's tailored - and priced - to your specific needs.

Buy direct from Tandon and you've got our promise of helpful, knowledgeable, no-pressure sales assistance, prompt delivery, telephone technical support, one-year limited warranty, and a no-exceptions 30-day moneyback guarantee.

Buy from an authorized Tandon business partner, and you'll be working with fully-trained systems professionals, ready to provide everything from planning, installation,

training and support services to applications development, system customization, network design, and multi-vendor solutions.

Take a close look at the outstanding lineup of Tandon computers featured in the following pages. Then call us. We'll not only help you select the system that's right for you. We'll help you select the best way to buy it.

A COLORFUL REASON TO ORDER BEFORE SEPTEMBER 30.

With each Tandon system you buy before September 30, 1990, we're enclosing a 10-pack of premium-quality Tandon diskettes in a rainbow assortment of colors. Once you experience the convenience of Tandon color-coded diskettes, you'll want more, so re-orders are available in quantity.

(800) 800-8850

Canada: (800) 359-8263

Outside Continental US: (805) 523-0340

Tandon

Where it pays to be direct

BRIGHT ENOUGH

STANDARD FEATURES

3.5-inch high-density, double-sided 1.44 MB diskette drive also reads 720 KB diskettes.

40 MB IDE hard drive.

(LT 386sx) 16 MHz 80386SX processor;

(LT 286) 12 MHz 80C286 processor; keyboard selectable clock speeds.

1 MB memory, diskette drive, video controllers, IBM®-compatible parallel and RS-232-C serial ports, optional math co-processor socket on main board.

Built-in single screen system setup utility automatically configures diskette drive, security, standby mode, ROM shadowing, serial and parallel options; easy selection of security levels, external peripherals, and routine functions such as date, time, language, etc.

Monochrome backlit liquid crystal (LCD) video display with 16 shades of gray can be set to write dark characters on light

background, or light characters on dark. I/O

port supports external color or monochrome VGA™ (LT 386sx) or EGA™ (LT 286) monitor.

82-key keyboard emulates 101-key keyboard with embedded keypad and 12 function keys; password security; supports external keyboard and 10-key keypad.

TANDON LT 286™: LAP UP THESE FEATURES. ~~\$2,499.~~

Special introductory price*: \$1,999. Save \$500.

The Tandon LT 286 features many of the innovations that we've built into the Tandon LT 386sx. All of which makes for an outstanding 286-based laptop. In fact, our dual-panel LCD technology delivers an EGA video refresh rate which *PC Magazine* reports is "among the fastest in its class."

Tandon's innovative selectable ROM shadowing is also incorporated in the Tandon LT 286, providing significantly faster execution of ROM-based instructions.

Add the same energy conservation features we provide on our LT 386sx, and you've got more than a laptop you can live with. You've got a laptop you'll love. Call today and lap one up.



TO GO PLACES.

TANDON LT 386sx™ PUTS A HANDLE ON POWER. ~~\$2899.~~

Special introductory price*: \$2,499. Save \$400.

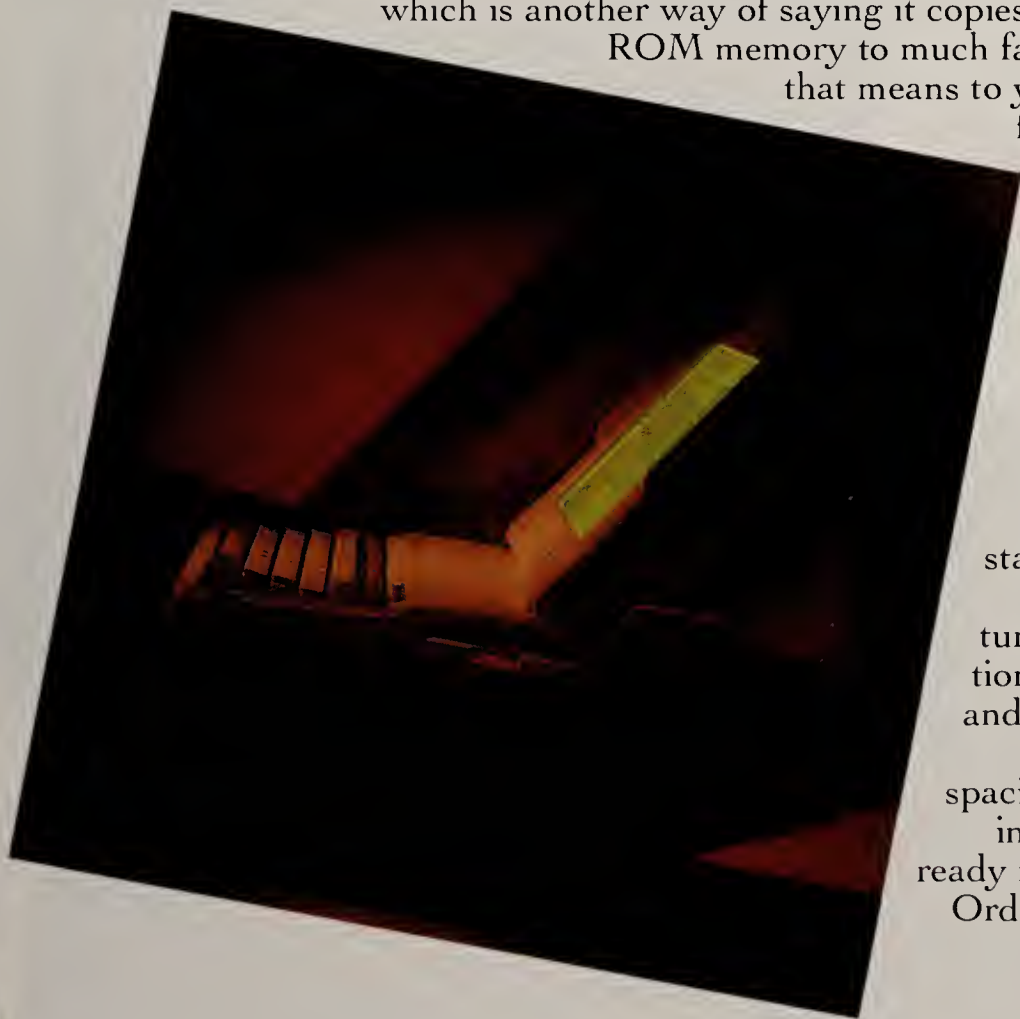
Even most desktop systems don't pack the power of Tandon's LT 386sx laptop. Beneath the sleek, slim case, a full 32-bit internal 386SX™ processor purrs confidently at 16 MHz. Accompanied by a generous 40 MB hard disk, 1 MB RAM (expandable to 5 MB,) and rechargeable battery.

The backlit VGA monochrome display provides outstanding graphic resolution, with up to 16 shades of gray, and operates with light-on-dark, or dark-on-light characters, as you prefer. Dual-panel LCD technology not only makes the display one of the brightest of any laptop, but refreshingly fast on video refresh - a significant consideration for users of Microsoft Windows™, CAD software, desktop publishing, and the other powerful graphic applications for which the Tandon LT 386sx is eminently suitable.

A unique Tandon innovation provides selectable ROM shadowing, which is another way of saying it copies instructions from ROM memory to much faster RAM. What that means to you is significantly faster execution of ROM-based instructions.

Energy conservation is on everyone's mind these days. The Tandon LT 386sx does its part, with selectable lower clock speeds, and standby mode: automatic or manual turnoff and reactivation of the hard drive and screen as needed.

Add the optional spacious, stylish carrying case, and you're ready for a power lunch. Order in your Tandon LT 386sx today.



STANDARD FEATURES (cont.)

LED indicators for low battery, fixed and diskette drive operation, keyboard status (Num, Caps, and Scroll Lock).

Proprietary 16-bit expansion slot with AT®-bus and RS-232-C signals.

Autosensing AC adapter/charger accepts 100 to 265 VAC input; Nickel-Cadmium battery pack provides 2 to 3 hours portable operation, depending on battery conservation techniques employed.

Built-in speaker with programmable, IBM-compatible sound.

Dimensions: 12.7 in. wide by 13.6 in. deep by 3.4 in. high. Weight 14.5 lbs.

System unit and power/adaptor cord, operation and installation manual, Tandon MS-DOS 3.3 loaded on fixed disk.

OPTIONAL FEATURES

Custom fabric carrying case, 2 MB memory modules (to 5 MB total), external numeric keypad, external 5.25-inch diskette drive, Tandon MS-DOS diskette and manual, Windows™ 3.0

Tandon LT 386sx/40, VGA:
\$2,899
Introductory price: \$2,499

Tandon LT 286/40, EGA:
\$2,499
Introductory Price: \$1,999

*Introductory price offer good until August 31, 1990

(800) 800-8850

Canada: (800) 359-8263

Outside Continental US: (805) 523-0340

Tandon

Where it pays to be direct

THE THIN LINE THAT SEPARATE

STANDARD FEATURES

3.5-inch high-density, double-sided 1.44 MB diskette drive, or 5.25-inch 1.2 MB diskette drive.

Two-speed 8/16 MHz 80386SX processor (SL 386sx); Two-speed 8/25 MHz 80486 processor (SL 486); keyboard selectable clock speeds.

1 MB memory, diskette drive controller, video controllers, IBM-compatible parallel and two RS-232-C serial ports, optional math co-processor socket on main board.

Built-in single screen system setup utility automatically configures diskette drive, security and serial and parallel options; easy selection of security levels, external peripherals, and routine functions such as date, time, language, etc.

Universal 101-key enhanced layout, low profile with 12 function keys; LED indicators for Num Lock, Caps Lock, and Scroll Lock Keys; password security.

TANDON SL 386sx™ PUTS POWER ON YOUR DESK WITHOUT TAKING IT OVER. \$2100.

We've combined Intel 80386 power, technology and features with unique Tandon innovations to deliver outstanding performance in a compact, slimline package.

Full 32-bit internal processing means that the Tandon SL 386sx (the SL stands for slimline) will run your existing applications faster. While its advanced instruction set lets you also move up to advanced multitasking software and applications, such as Windows 3.0. Of course, all 386SX systems will do that. Here's why ours does it better:

A proprietary Tandon chip called MIAT™ (which stands for Mapper-Integrated AT) provides a higher level of systems integration. But don't let the buzzwords baffle you. What we're talking about is fewer components and greater reliability.

The low profile, small footprint package doesn't dominate your desk, yet contains more than enough internal expandability for most applications. For which you can thank another aspect of the Tandon SL 386sx: communications ports, mass storage controllers and an optional VGA graphics interface are all resident on the main board.

And that's enough innovation to keep most users happy for a long, long time.



S US FROM THE COMPETITION.

TANDON SL 486™ IS ABOUT AS MUCH POWER AS ONE PERSON CAN HANDLE. \$4399.

If computers were cars, this one wouldn't be designed yet. We've put the awesome power of the Intel 80486™ chip in a slimline package to produce the ultimate single-user power machine. Not to mention an extremely economical way to put 486 technology at your fingertips. And it's no slouch when it comes to networking, either.

As you may know, 486 technology combines the 80386 instruction set, numeric coprocessor and 8K memory cache on a single chip. All of which frees up the memory bus from data read bottlenecks, and results in faster operation.

But with the input bottleneck removed, the next place your programs can get bogged down is - you guessed it - output. So

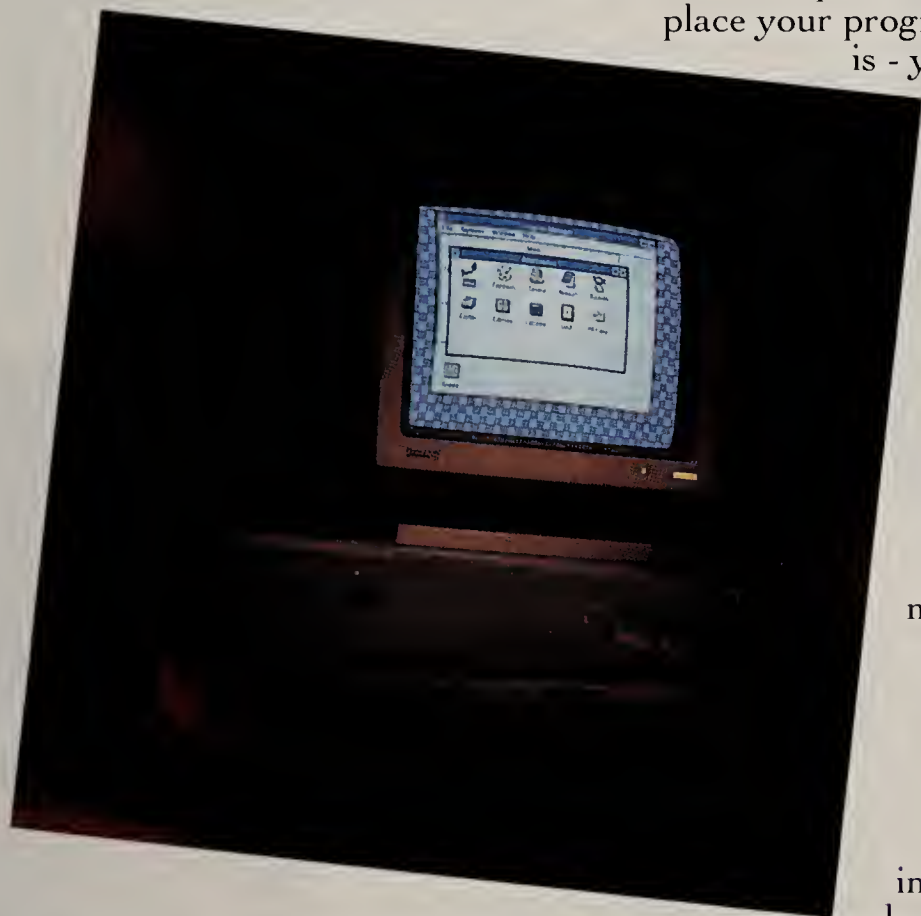
in the Tandon SL 486, we've added an exclusive new feature to nip that problem in the bud: the PowerPoster™.

This is our brand name for an intelligent buffer that speeds write operations to RAM. Another advantage of the PowerPoster is that it eliminates the need for the more expensive external cache memories found on some of our competitors' 486 systems. And leads a step closer to the Holy Grail of computer design: greater price/performance.

The Tandon SL 486 also incorporates two other Tandon innovations that we hope

you're becoming familiar with: Tandon's Memory Mapper, providing Shadow RAM for faster processor performance, and the MIAT chip for greater integration, and resulting higher reliability.

If you're a power user considering a high end 386-based system for compute-intensive applications such as CAD, graphics, or large spreadsheets, the Tandon SL 486 was designed to win you over.



STANDARD FEATURES (cont.)

Two 5-1/4 inch and one 3-1/2 inch drive bays.

Personal password protects data and software.

Three 16-bit AT-compatible expansion slots and one XT™ compatible slot.

130-watt, fan-cooled power supply; switchable to 115 volts or 230 volts.

Built-in speaker with programmable, IBM-compatible sound.

Dimensions: 18.3 in. wide by 16 in. deep by 5 in. high.
Weight 31 lbs. (SL 386sx); 32 lbs. (SL 486).

System unit, keyboard, power cord, operation and installation manual, Tandon MS-DOS software and manual.

OPTIONAL FEATURES

Memory modules (to 5 MB total).
Windows 3.0, 80387SX math co-processor (SL 386sx); 110 MB or 200 MB IDE fixed disk.

Tandon SL 386sx \$2,100.
Tandon SL 486 \$4,399.

Both systems include
1 MB RAM, 40MB IDE drive,
VGA monochrome monitor,
16-bit video card.

(800) 800-8850

Canada: (800) 359-8263

Outside Continental US: (805) 523-0340

Tandon

Where it pays to be direct



THEIS: "No ideas are ignored."

department to my knowledge and abilities," he said. That means that Theis, like virtually all 3M managers, spends a lot of time meeting with people to listen to their ideas—and then making sure they have the opportunity to follow through. "No ideas are ignored," he said.

No wonder: Some of these ideas have paid off handsomely. The group's plant in Brookings, S.D., for example, now boasts an integrated manufacturing system that tracks and controls virtually every aspect of production, including collecting customer orders, scheduling manufacturing jobs, controlling computerized machinery, producing production reports and supplying lot-tracking data required by the Food and Drug Administration—all for up to 100 products at a time.

The department also came up with a system to boost the company's position in the hospital supply market. Baxter International Inc. has long

dominated this market by virtue of the famed customer-order terminals that American Hospital Supply Corp. (since merged with Baxter Travenol Laboratories to become Baxter International Inc.) placed in hospitals, allowing hospital purchasing agents to place orders directly into Baxter's system. But the 3M Health Care system—developed jointly with Abbott Laboratories—offers a critical advantage over Baxter's system: It allows customers to select from a variety of vendors when ordering

supplies. Instead of using its link to lock customers in, 3M is trying to gain an edge by freeing customers up, on the assumption that the more freedom customers have, the more likely they will be to order from 3M.

Theis believes that tying systems into customers, as well as into suppliers, will play an increasingly large role in 3M's business. To that end, he has established a "strategic linkages" unit within his department charged with exploring and developing additional opportunities. "We're looking at ways we can connect to hospitals, distributors, insurance companies and others," he said. "Sharing information is always emphasized at 3M, whether it's inside or outside the company."

Reducing time to market is also one of Theis's key concerns. One new system helps Health Care speed products onto shelves by helping to deal with the widely varying government regulations in each of the many

countries in which it sells. "Our system keeps track of what's happening at each country's equivalent of the FDA while a product is still in the lab," he explained. "Then when the product is developed, we can release it simultaneously around the world."

Theis attributes his department's successes directly to the free rein everyone has been given to define and carry out their jobs. As an example, he tells how he was recently walking past a staff member's office when he noticed a suitcase on her desk. He asked her where she was off to; "I don't know," she replied. It turned out that users were having problems with an application the department had supplied, and the staff member had decided that if she couldn't quickly clear up the problems on the phone, she would fly out to one of the sites and deal with the complaints in person. "I didn't tell her to do that," beamed Theis. "It was her

3M's 60,000 PRODUCTS include (clockwise from top) the familiar Scotch tape and Post-it notes, wood-finishing products and computer-aided surgical equipment.



Alpha award winner Julie Houghton says that formal strategies to encourage innovative thinking are "very much in the spirit of the company" and are among the reasons "people don't leave."



HOUGHTON: a 3M Alpha Award winner

idea, and she felt free to do it."

3M's Memory Technologies Group, the company's largest, has also relied heavily on IT to leverage its innovation. Producing and marketing data diskettes, video and audio tape, and a range of other recording products, the group faces intense competition from Japan. In addition, it must deal with a fast-paced, sprawling marketing arena that encompasses 18 different channels of distribution ranging from large computer manufacturers to retail department stores. Increasingly, the group looks to IT to give it an edge. "A lot of what we do is considered mission critical," said group IT manager Julie Houghton.

Among the applications Houghton's department has developed is one that helps track the endless stream of sales promotions the group runs. "When you run a promotion," she explained, "you have to make sure the order

qualifies for the promotion—that it was booked, shipped and billed for within the required time period—and that rebates are sent out." But since the group's order-processing and billing systems used to provide only monthly reports, it could only track the promotion to make sure that it started on a billing cut-off date, and then just note which orders came in within the timeframe of the promotion. Houghton's department added a system that could provide information on sales and billing on a daily basis, enabling more flexibility in the timing and complexity of promotions. "As we get better," she said, "it allows the marketing people to be more creative."

IT has also helped the group out on the accounts-receivable end as well. A few years ago the group found that outstanding receivables for some of its product lines had slipped down to the two-year level, versus the 60 days that the group had set as a goal. To get things back into shape, the IT department developed a system that not only flagged outstanding receivables but matched them to the appropriate managers in the sales and credit departments. The two managers could then meet with the customer to work out a payment plan. To their surprise, managers soon discovered that most of the customers had been holding back payment because of what they perceived to be discrepancies in invoices. Now the group takes pains to clarify its billing and quickly resolve any questions with customers. Outstanding receivables are back down below 60 days.

Houghton is also a winner of a 3M "Alpha" award, which provides funding for innovative ideas that don't fall into normal product-development

funding channels (each year 3M also awards up to 90 \$50,000 "Genesis" grants for ideas that could theoretically result in new products). Houghton's idea: a system that links sales forecasting to manufacturing capacity and profit and loss data. The company liked the idea so much, in fact, that it asked Houghton and other managers interested in forecasting to propose a system that could be used on a corporate level. "That sort of encouragement is very much in the spirit of the company," she said. "It's why people don't leave."

The corporate staff affirms this fact: Every executive has been with 3M at least 25 years.

Kuhrmeyer, who has been with 3M for 39 years, contends that this mutual commitment on the part of the company and its employees is at the heart of 3M's success with innovation, whether involving IT or not. "We have executives from other companies coming here to find out how we've done all this," he said. "We try to tell them, but most just don't believe us. The simple truth is, if you're enjoying yourself and you believe you're making a contribution to the company, then you'll do a good job."

It's a concept that seems to have paid off in 3M's IT efforts—not to mention in its bottom line. 

David Freedman is a freelance writer based in Brookline, Mass.



Great ideas are only a beginning. The real challenge is how to implant the practice of innovation in an organization's genetic code

PUTTING GENIUS TO WORK

ROSABETH MOSS KANTER, the Harvard Business Review's new editor, has made a career of examining how innovation is woven into the fabric of an organization. For 23 years, as a professor, author, consultant and corporate director, Kanter has studied how companies either support or stifle innovation. Her work gained her a chair at the Harvard Business School dedicated to innovation and entrepreneurship in established companies.

Ten books and scores of articles have issued from her prolific pen, including *When Giants Learn to Dance* (1989), *The Change Masters: Innovation and Entrepreneurship in the American Corporation* (1985), and *Men and Women of the Corporation* (1979). Her latest endeavor is a video from the Harvard Business School: *Rosabeth Moss Kanter on Synergies, Alliances and New Businesses*.

Kanter sees the Harvard Business Review as a place where she can implement her ideas on innovation. She plans to turn the review's operations into a "management laboratory, a laboratory for innovation." But she also regards her new post as "another platform [across which] to bring the best ideas to business, at a time when business is undergoing enormous change. It gives me a hunting license to scout the world for ideas."

And as Kanter told CIO Senior Editor Allan E. Alter, the hunting should be good in the 1990s.

BY ALLAN E. ALTER



Innovation may be one of the fuzzy buzzwords of common business parlance, but innovation is anything but fuzzy for Rosabeth Moss Kanter. "We know a lot about the innovative process and how it works: where ideas come from, how they move forward, how you work in the innovative process."

In the course of discovering what innovation is, Kanter has also discovered what it is not. Innovation, she believes, is not simply creativity; it is "connected with implementation. It's not just having new ideas; it's acting on them. Innovation covers a broad range; . . . not just technology and products, but systems, processes, programs, ways of operating."

In fact, companies often gain strategic advantage from innovative concepts rather than from technologies. "The concept of [buying cars on] credit was one of the major innovations of General Motors. Most people would

say it was something in an engine, but it was credit that gave people the ability to finance a very large purchase."

Nor is innovation about big breakthroughs, according to Kanter. "Some of the most innovative companies engage in incremental innovation [and] continuous improvement. Their edge is not [the result of] one major breakthrough, but [of] pushing the frontiers in every field. It's terrific to have a major breakthrough, but it's not as much an advantage as being able to innovate with or without a major invention. The companies that survive are not always the inventors, but the ones that are the first to exploit an invention. Again, the operative word is *use*."

Neither is innovation "something done by the lone genius in isolation. . . . Innovation is effective when the organizational context supports it. Innovators marshal support from the rest of the organization to get things done."



Real-World ISDN.

As an idea, ISDN technology ranks right up there with sliced bread. But what can it do for you in the real world? The U.S. Army's strategic research and development facility at Redstone Arsenal found the answer at their local phone company. South Central Bell showed them how to enlist ISDN technology to help them perform their crucial communications tasks.

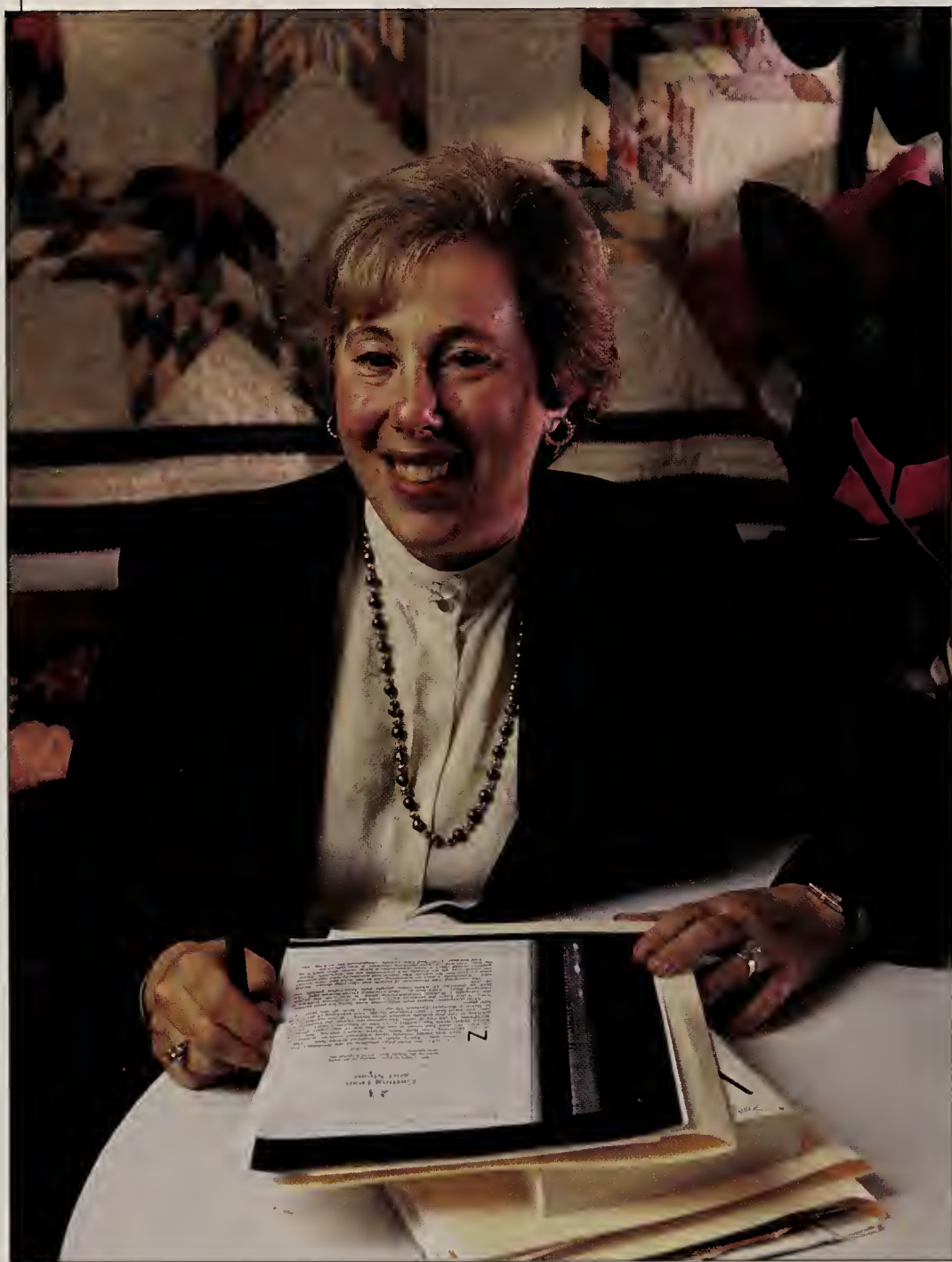
**South Central Bell
and the U.S. Army**

Faster. More efficiently. Using the AT&T Network Systems 5ESS® Switch. Now, guided by ISDN technology, Army researchers and engineers can use a single telephone line to deploy simultaneous voice and data transactions. At speeds up to 64Kbs. A mission that used to require special conditioned private lines can now be accomplished on ordinary telephone lines over the public switched network. Call your local telephone company marketing representative to find out how ISDN technology can help you win in the real world or call 1 800 638-7978, ext. 3010.



AT&T

Network Systems



"It's terrific to have a major breakthrough, but it's not as much an advantage as being able to innovate with or without a major invention."

But perhaps what businesspeople need to understand most about innovation in 1990 is that it has become a necessity.

From a historical perspective, "innovation has always been a dynamic force, but innovation is an even higher priority today. There are times in history when the pace of change speeds up. We are in one of those periods."

According to Kanter, this era of innovation began with the technological breakthroughs, social upheaval and experimentation of the '60s. Those events caught up with the business world in the '70s, a decade that saw the first clashes between new possibilities and the

established order, and the first glimmerings that the old ways of business would no longer be effective in the global economy. In the 1980s, said Kanter, "the new ideas moved from the periphery to center stage. American companies began to recognize their shortcomings. The entrepreneurial companies outperformed established companies and became the model."

"In the 1980s we identified the new management paradigm; in the 1990s we will implement it," Kanter continued. "The motif of the '90s will be execution, implementation and action. In the 1980s, leading-edge companies pioneered new ways of managing to get innovation. In the 1990s it will become mainstream."

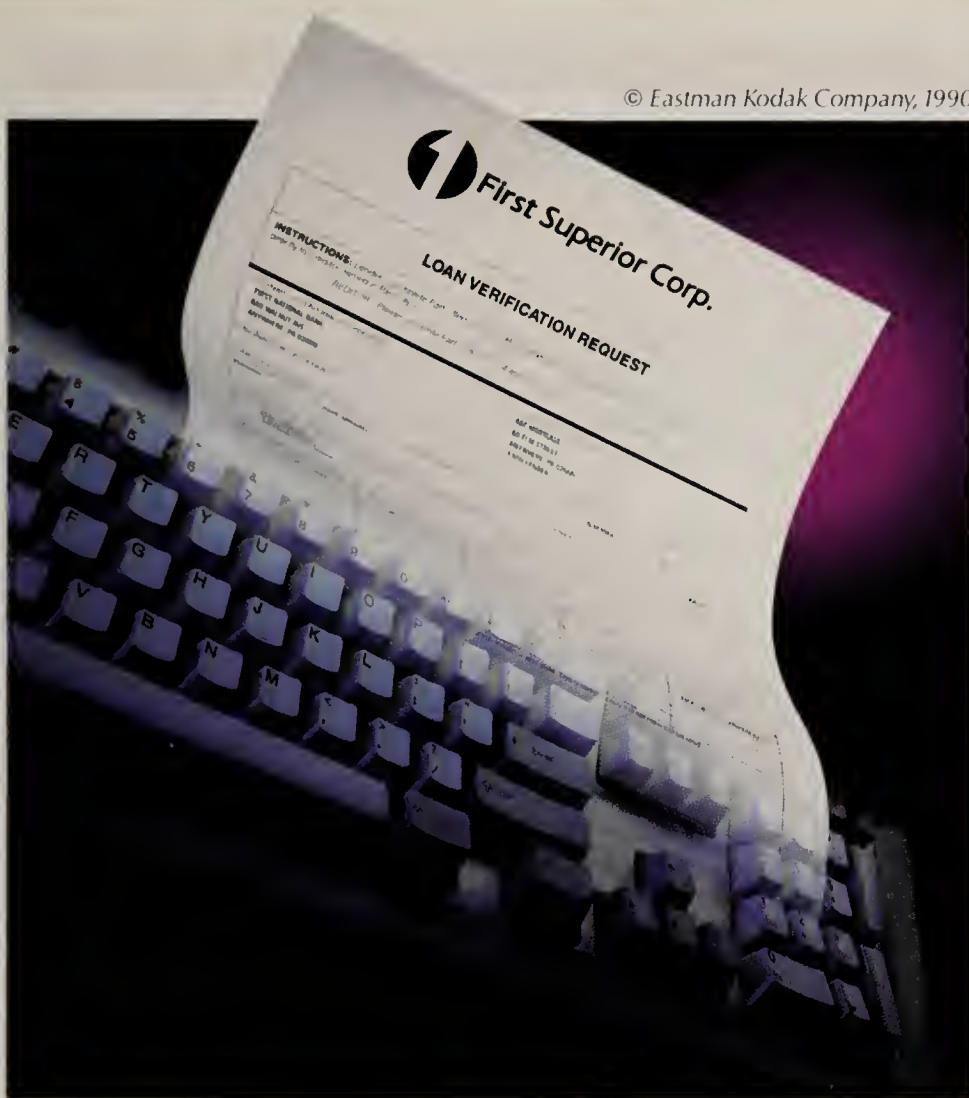
The companies that will successfully innovate in the 1990s will be "post-entrepreneurial," according to Kanter. These companies will "preserve the entrepreneurial spirit" of a start-up. They will "have room for creative, innovative new possibilities." However, they will accomplish this "in a disciplined, focused and resource-conserving way that is sustainable for the long run. Leverage is the operative word for the new organizations—making more of what you've already got."

According to Kanter, successful innovators of the 1990s will gain leverage by pursuing synergies, alliances and new ventures.

Synergy makes a business more than just the sum of its parts. "Synergy means you should get a multiplier, an extra benefit, because you get those parts together." Synergy, Kanter said, is "a wonderful buzzword that everyone throws around and most companies don't [put into practice]." However, the innovators of the 1990s will maximize synergies to cut costs and run their businesses more efficiently. By circulating ideas, practices and technologies, companies can not just increase the skill level of their employees, but develop their ability to recognize and seize new market opportunities. She recalled a friend, a former employee of CBS Records, who lamented that "CBS, the world's largest broadcaster and the world's largest record company, did not think of MTV."

Alliances with outside companies is another way innovators will do more with less in the 1990s. Kanter does not believe that the most powerful alliances will be joint ventures, where two companies create a third company. Rather, "the most powerful form of advantage" will come from linkages that create "a value chain—a food chain responsible for providing every final good to the customer." These in-

© Eastman Kodak Company, 1990



The paperless office is a myth. The information challenge for the future—necessarily—is to manage the image of that paper swiftly, economically, electronically.

Is the handling of paper-based information holding up your time-sensitive office operations? Use an electronic image and our application-specific work-in-process software, and Kodak electronic imaging systems can help you streamline and manage the process. Print it. Fax it. Suspend it. Route it. By freeing you from paperwork, Kodak imaging systems can reduce file space and look-up time, and bring you the benefit of a totally integrated information environment.

*We have more than 60 years of business imaging experience to share. Ask your KODAK Business Imaging Systems representative how image management can benefit your information management. **Call 1 800 445-6325, Ext. 331.***

MANAGE THE IMAGE. CALL KODAK

The new vision of Kodak



clude linkages between suppliers and customers, and manufacturers and distributors (see "Members Only," *CIO*, May 1990).

Benetton and NCR are two innovative companies that have gained leverage through a linkage strategy, according to Kanter. "Benetton competes through relationships. It doesn't own its manufacturing plants or its retail stores." Rather, Benetton "manages the communication" between these independent entities, using information technology to quickly restock shelves with whatever its customers are buying.

.....

The companies that will successfully innovate in the 1990s will be "post-entrepreneurial. . . . Leverage is the operative word for the new organizations—making more of what you've already got."

.....

NCR was able to introduce an Intel 80486-based PC before its competition, said Kanter, because its unusually close working relationship with the chip-maker sped up the development process. NCR treats Intel as a partner, not a supplier to be kept at a distance. As part of this policy, Kanter noted, NCR has assigned an employee to function as Intel's advocate within the company. This arrangement has worked so well that Intel has done likewise, assigning one of its employees to champion NCR's interests with the supplier.

Innovative companies will also continue to launch new ventures, according to Kanter—to seize technologies and ideas that already exist inside the company and take them in new directions or harness them to existing businesses. In *The Change Masters*, Kanter documents how the process of innovation works by nurturing and protecting new ideas.

To help describe this process, Kanter coined the term "newstream," which she defines as an innovative new undertaking within a company, in contrast to its mainstream business. Corporations must make a deliberate effort if newstreams are to flourish. "People understand immediately that the power and momentum of the mainstream [of a business] can kill new ideas. You need a pathway to express and communicate new ideas, and a way

to sponsor, fund and protect them while they are still new." And companies need to nurture many new possibilities, not just permit the occasional project. E.I. du Pont de Nemours & Co., with its many artificial-intelligence projects, "is very good at this," said Kanter.

But the biggest challenge companies face is not likely to be how to generate new ideas, but introduce newstreams within existing organizations so that they take root and thrive. That, said Kanter, "is the innovation challenge: [creating] a flow of prototypes and new possibilities that keep the mainstream from drying up."

Putting these ideas into practice will not be easy, even in the 1990s. Companies must invest in change. They "have to change the reward system, the communication system, the way departments relate to each other," Kanter said. They have to "change their connection with suppliers [as well as] their accounting and measurement systems."

Furthermore, organizations must avoid two mistakes that can kill innovation efforts: bureaucratic inertia, and not investing enough in executing change.

"Everybody underestimates the cost of change and the time change takes, so they underinvest," said Kanter. "That's the biggest single mistake companies make. That's when they run into problems; that's when they have sloppy, wasteful execution. I'm beginning to think that a well-implemented third-rate idea is better than a brilliant idea without the resources to back it up."

But if there is one point Kanter wishes she had emphasized more in her earlier writings, it is "the staying power of bureaucracy and the inertia of the big corporation. Implementation, acting on the new ideas, is a longer, harder process for a big bureaucracy than I [originally thought it was]." When Roger Smith became president of General Motors, "he sounded like he would just revolutionize the company. But GM was a company that seemed to manage itself by looking backwards. GM had all the elements but just didn't act on them.

"The point is, do it. The ideas are there; the question is the will to do it."

IS organizations and executives can play an important role in corporate innovation—not just by providing technological savvy, but also by introducing some key concepts to their companies.

"The concept of the networked organization, which is big in the IT world, is going to be very important to helping organizations re-



NewsFlash[®]
Eliminates
The Haystack.
Again And
Again.

Right now. This second.
You can find out what your competitors are doing. Or read about a technological breakthrough in your industry. Long before your competition does.

With NewsFlash. The electronic clipping service from NewsNet that literally brings you all the breaking news on topics *you* specify. Often before it's in print.

In fact, as soon as the subject you choose makes news, you can read about it. Because NewsFlash has no time embargoes.

So the news can flash right on your PC.

Or even throughout your LAN.

With NewsFlash, you have instant access to 10 domestic and international newswires. And over 350 newsletters and trade publications. All full-text, in-depth reports written by the most respected experts in the field.

Now every minute. Of every hour. Of every day. NewsFlash can bring anyone in your company intelligence that will put you ahead of the competition.

Think about it.

Finding the needle in the haystack can be

that simple with NewsNet.[®] The database system that makes you look sharp.

Call us and mention this ad. We'll put you online for a free demonstration. Right now. Right over the phone.

Call toll-free:

1-800-345-1301

Outside the U.S. call: (215) 527-8030



NewsNet Knows It Now

945 Haverford Road, Bryn Mawr, PA 19010

alize synergies," Kanter said. "It's the only way to create new possibilities by combining what you have in novel ways." Networked organizations can transfer technologies, ideas and skills to employees and outside allies, wherever they are located around the world. But perhaps the greatest power of networks is their ability to enable organizations to continually change their structures. Through networks, organizations can gain the flexibility to combine the various talents of their employees in new ways, creating clusters of employees that "come and go as new projects come and go." Networks can even help organizations "identify just that cluster of people who ought to be pursuing innovations."

Systems—a familiar concept for information professionals—is another important idea CIOs can instill in the rest of the company, according to Kanter. General managers and functional managers "don't think about the total system in which [business] is done. Systems thinking as a metaphor is a very important management concept that information

people ought to teach the rest of their companies. . . . American business has been criticized for emphasizing the quick fix," said Kanter. "I think the real problem has been emphasizing the single hit"—the notion that a company can turn itself around "if we only had one isolated idea, improved one marketing program or one new product . . ." Systems thinking is a way to avoid this problem.

But CIOs can only introduce these concepts if others are listening. Kanter has heard quite a few CIOs complain that they are not being heard. "I talk to CIOs who express frustration that they don't get into [top-level executive] discussions. The information team has new ideas up the kazoo but they complain they can't get anyone else in the company to sit still [long] enough to listen to new ideas."

To Kanter, such complaints are proof that the challenge for CIOs, as with newstreams, is to have their ideas adopted by existing organizations. Don't complain, argued Kanter—develop the knowledge, skills and relationships needed to reach out to others.

CIOs who wish to get involved in those top executive meetings "have to think cross-functionally. [They must] make it useful to have [them] sitting there when other executives are discussing a people issue." Top information people should attend "general management courses, executive programs—not only on the information resource, but on the rest of the business."

CIOs must learn to be good politicians. "The key is having something other people want that meets their needs. You have to start by understanding your market—your user. It's so obvious, but it's breached in practice." Kanter believes that failures in leadership are often wrongly blamed on politics. "When people say they have political obstacles, they are saying 'I have all these wonderful solutions to problems people don't have.'"

To sell new ideas effectively, according to Kanter, CIOs must build relationships with people outside the IS organizations. They should "walk through the organization and sit down with people and talk to them." Plant seeds, she advised; share ideas with users even before those ideas are fully developed. "People always resist changes that come as a total surprise and make them feel stupid."

"We have too much emphasis in this country on technology as an end in itself," concluded Kanter. When it comes to creating and implementing innovation, "the people factors count for much more. A brilliant idea is not a brilliant idea unless others think so." CIO

"I'm beginning to think that a well-implemented third-rate idea is better than a brilliant idea without the resources to back it up."



WE RENT THE SUN, THE MOON, AND THE STARS.



NOT TO MENTION PCs, PERIPHERALS, MINIS AND NETWORKS.

That's a pretty big claim. But Data Preference is ready to back it up.

With a stellar selection of new, high-performance PCs, peripherals, minicomputers, workstations and network software from the largest variety of vendors under the sun.

And with an entire galaxy of support services, including installation, on-site or return-to-depot maintenance, time-and-materials programs, a toll-free diagnostics line, and a lot more.

In fact, whatever your preference in computers, Data Preference has it. Just like we did under our old name, Leasametric Data Communications, since 1962.

We cover the entire universe of finance programs, too, including renting, leasing, and sales. Not to mention offices across the U.S. and in the U.K.

So, if you've been searching the skies for the best service and selection in computers, look up Data Preference. We'll move heaven and earth to find the best rental package to meet your needs.

DATAPreference

Incorporated

Formerly Leasametric Data Communications, Inc.

Northwest 800.343.7368, 415.574.5797 • Southwest 800.638.7854, 818.708.2669 • Central 800.323.4823, 708.595.2700 • Northeast 800.241.5841
• Southeast 800.241.5841, 404.925.7980 • London 011.44.923.897000. Copyright © 1990 Data Preference Incorporated.



WHO, WHAT, WHERE, WHEN...

Some vital statistics on the CIO 100
organizations and their CIOs

COMPANY/LOCATION/ LINE OF BUSINESS	REVE- NUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/ TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
3M St. Paul, Minn. <i>Manufacturing</i>	\$12 B	\$450 M	2,000	Carl A. Kuhrmeyer VP/Admin.	IS, Eng., Gen. mgmt., Mktg. & Ops.	Exec. VP	2	39	10
Alza Corp. Palo Alto, Calif. <i>Pharmaceuticals</i>	\$92.7 M	*\$1.95 M	*24	Fred A. Knox Dir./Information Services	IS & Engineering	VP/Admin.	3	16	2
American Airlines Inc. (Subs. of AMR Corp.) Dallas <i>Air transportation</i>	\$8.8 B			Max D. Hopper Sr. VP/IS				18	
American President Compa- nies Ltd. Oakland, Calif. <i>Freight transport</i>	\$2.23 B	\$90 M	450	James S. Marston Sr. VP & CIO	IS, Govt. & Ops.	CEO	1	2.5	2.5
Apple Computer Inc. Cupertino, Calif. <i>Personal computers</i>	\$5.3 B			Deborah A. Coleman VP/IS & Technology	IS, Acct., Eng., Fin., Gen. mgmt. & Mfg.	CFO	2	9	5 mos.
Applied Biosystems Inc. Foster City, Calif. <i>Biotechnology equipment</i>	\$158 M			Richard Thompson Dir./MIS					
Asea Brown Boveri Zurich, Switzerland <i>Electric power equipment</i>	\$525 M								
Atlantic Richfield Co. Los Angeles <i>Petroleum exploration and refining</i>	\$16.8 B	\$248 M	1,236	John F. Coman Manager/Networks & Information Services	Eng., Gen. mgmt. & Ops.	VP & Controller	3	10	2
Banc One Corp. Columbus, Ohio <i>Financial services</i>	\$362 M	\$100 M	600	David Van Lear Pres. & CEO/Banc One Services Corp.	IS & Finance	CEO/Banc One Corp.	1	4	2
BellSouth Corp. Atlanta <i>Telecommunications</i>				Don E. Daniels VP/IS of BellSouth Services	IS, Acct. & Fin.	CEO	1	28	3

COMPANY/LOCATION/ LINE OF BUSINESS	REVE- NUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/ TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Ben & Jerry's Homemade Inc. Waterbury, Vt. <i>Ice cream</i>	\$58 M	\$730 K	7	Keith E. Williams Dir./Information Services	IS & Education	General Manager	2	2	2
Benetton SPA Ponzano Veneto, Italy <i>Apparel manufacturing and retailing</i>	\$1.3 B	\$15 M	100	Bruno Zuccaro Dir./IS	IS	COO	2	5	5
Blue Cross and Blue Shield of Minnesota St. Paul, Minn. <i>Health care insurance</i>	\$876 M	\$20.6 M	290	Alfred D. Anderson VP/IS	IS & Operations	Group VP	2	21	6
The Body Shop Inc. Cedar Knolls, N.J. <i>Personal care products</i>	\$10.5 M	\$100,000	2	Rick Hellar Systems Manager		VP/Ops.		4 mos.	4 mos.
The Boeing Co. Seattle <i>Aerospace</i>	\$20.2 B		13,000 +	Arthur Hitsman Pres./Boeing Computer Services	Eng., Gen. mgmt., Govt. & Ops.	CEO	1	40	5 mos.
Bose Corp. Framingham, Mass. <i>Audio products</i>	\$300 + M	\$5 M	50	Warren L. Harkness Dir./Information Services	IS, Eng. & Mktg.	CFO	2	4.5	4.5
British Airways PLC Hounslow, England <i>Air transportation</i>	\$7.2 B	\$245 M	2,300	John Watson Dir./Information Management	IS & Gen. mgmt.	CEO	1	19	7
C&J Industries Meadville, Pa. <i>Telecommunications and office equipment</i>	information not available								
Canon Inc. Tokyo <i>Electronics and office equipment</i>	information not available								
Cargill Inc. Minnetonka, Minn. <i>Bulk commodities</i>		\$110 M	600	Gene D. Gross VP/IS	IS	Corporate Controller	3	30	18
Chaparral Steel Co. Midlothian, Texas <i>Steel production</i>	\$376.3 M	additional information not available							
Citicorp New York <i>Financial services</i>	\$3.6 B	currently vacant							
Compaq Computer Corp. Houston <i>Personal computers</i>	\$2.9 B			Fred P. Jones Dir./Information Mangement		CFO		4	4
Corning Inc. Corning, N.Y. <i>Glass and ceramics</i>	\$2.4 B	\$28 M	240	Harvey R. Shrednick VP/Information Services	IS, Eng., Gen. mgmt. & Ops.	Vice Chairman	2	5	5
Covia Rosemont, Ill. <i>Computer reservation sys- tems</i>	\$500 M		950	Mark Teflian VP & CIO	IS, Eng. & Gen. mgmt.	CEO	1	15	2
Cray Research Inc. Minneapolis <i>Supercomputers</i>	\$787.7 M	currently vacant							
Cypress Semiconductor Corp. San Jose, Calif. <i>Semiconductors</i>	\$200 M	1.5% of total rev- enues	20	Rick Foreman Dir./Ops. Planning & MIS	Acct., Eng., Fin., Gen. mgmt. & Ops.	VP/Manufac- turing	2	7	6
Digital Equipment Corp. Maynard, Mass. <i>Computer products</i>	\$13 B		7,000	Donato (Dan) A. Infante VP/Information Management & Technology	Acct., Gen. mgmt., Ops. & Fin.	VP/Strategic Resources	2	17	8 mos.

Why Compaq will ne that simply

The way we see it, the so-so, the pretty good and the just plain average are things for someone else. Not for us. And most certainly not for you.



Before creating anything, we start with a clean slate, and talk to personal computer users like you.

That's the reason why every COMPAQ personal computer product ever introduced has been designed to deliver on a simple promise: to simply work better. It's what makes our high-performance PCs different from all the others.

The whole process starts with you.

Before we design our products, we sit down and talk with computer users like you. To see what you want. And what you need.

Then we take these ideas and combine them with the latest technology and our own innovative thinking.

The result is a line of PCs with the right performance for whatever you want to do. Performance that comes from more than just the processor. It includes features like high-speed disk drives and

VGA graphics. Room to customize and upgrade with expansion cards and peripherals. And the compatibility to work with the best of industry-standard technology.

This attention to detail is one reason why our PCs consistently earn the highest marks for quality from computer experts. And unsurpassed



COMPAQ personal computers earn an impressive number of industry awards. But it's all the things you can do with our PCs that's really impressive.

marks for satisfaction from PC users.

You'll see this thinking in every COMPAQ PC system,

desktop, portable and laptop we introduce.

The new COMPAQ DESKPRO 386N and COMPAQ DESKPRO 286N are the first COMPAQ personal computers designed with specific



network features. They're optimized to work in combination with the COMPAQ SYSTEMPRO PC System

The new COMPAQ SLT 386S/20, like all our laptops, is designed to fit where you work. Whether you're on the 35th floor overlooking Manhattan or at 35,000 feet over the Rockies.

ever introduce a PC works OK.

or powerful COMPAQ desktop servers.

The COMPAQ SYSTEMPRO brings an unprecedented combination of performance and

And for the ultimate in portability, the 8½" × 11" COMPAQ LTE and COMPAQ LTE/286 put the performance of a desktop personal com-



No matter what you do, there's a COMPAQ PC system, desktop, portable or laptop that will help you work better.

expandability to connected environments.

The new COMPAQ DESKPRO 386s/20 delivers power at the office without taking over your whole desk.



Every COMPAQ product is meticulously designed. Ideas that don't measure up will wind up here, not in your office.

The new COMPAQ SLT 386s/20 laptop lets you put that same high performance to work on the road or on your desk. Without compromising functionality or size.

puter in your briefcase. With room to spare.

All told, every COMPAQ PC ever introduced offers the difference between simply working OK and simply working better.

For more information and the location of an Authorized COMPAQ Computer Dealer, call 1-800-231-0900, Operator 117. In Canada, 1-800-263-5868, Operator 117.



A worldwide network of Authorized Dealers is ready and waiting to help you.

COMPAQ

It simply works better.

COMPANY/LOCATION/ LINE OF BUSINESS	REVE- NUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/ TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Dow Chemical Co. Midland, Mich. <i>Chemicals and plastics</i>	\$17.6 B	\$350 M	2,300	R.W. Boeker VP/IS	General management & Marketing.	Exec. VP	2	34	1
The Dun & Bradstreet Corp. New York <i>Publishing and information services</i>	\$4.3 B			Michael S. Field Pres./IS Management					8 mos.
AB Electrolux Stockholm, Sweden <i>Appliances</i>	\$13.9 B	\$160 M	1,500	Kurt Gladh VP/IS & Admin. Development	IS, Gen. mgmt., Mktg., & Consulting	Sr. VP/Admin.	2	6	6
Emerson Electric Co. St. Louis, Mo. <i>Electronics</i>	\$7 B								
	additional information not available								
Federal Express Corp. Memphis, Tenn. <i>Package delivery</i>	\$5 + B	5% of to- tal rev- enues	1,800	Ron Ponder Sr. VP/Information & Telecommunications Div.	IS, Eng. & Ops. research	COO	2	13	7
Fiat SPA Turin, Italy <i>Diversified automotive manufacturing</i>	\$41 B	\$650 M	4,500	Franco Gianolio Corporate VP/Systems & Telecommunications	IS		4	18	9
Flow International Corp. Kent, Wash. <i>Waterjet equipment</i>	\$46 M	\$800 K	7	Gerald E. Malmrose MIS Manager	IS, Eng., Ops. & Mfg.	CFO	2	7	7
Ford Motor Co. Dearborn, Mich. <i>Diversified automotive manufacturing</i>	\$92 B			S.I. Gilman Exec. Dir./IS					
Frito-Lay Inc. (Div. of PepsiCo) Dallas <i>Snack foods</i>	\$4.5 B		325	Charles S. Feld VP/MIS	IS	CFO	2	9	9
The Gillette Co. Boston <i>Consumer products</i>	\$3.6 B								
	additional information not available								
Glaxo Holdings PLC London <i>Pharmaceuticals</i>	\$4 B	\$100- \$200 M		Dr. David Horne Group Information Technology Controller	IS, Eng., Gen. mgmt., Govern- ment & Ops.	CFO	2	4 mos.	4 mos.
Globe Metallurgical Co. Beverly, Ohio <i>Metal alloys</i>	\$100 M								
	additional information not available								
H.B. Fuller Co. St. Paul, Minn. <i>Adhesive manufacturing</i>	\$753 M			John O. Bigalke Dir./IS	IS & Business consulting	Exec. VP	2	5.5	5.5
Hewlett-Packard Co. Palo Alto, Calif. <i>Computer systems</i>	\$11.9 B	4.4% of total rev- enues	4,500	Lloyd B. Taylor Dir./Corp. IS	Accounting & Finance	CFO	2	23	5
Hillenbrand Industries Inc. Batesville, Ind. <i>Health care and caskets</i>	\$1.1 B			Stephen E. Reiter Dir./Corp. MIS					
Honda Motor Corp. Ltd. Tokyo <i>Diversified automotive manufacturing</i>	information not available								
IBM Corp. Armonk, N.Y. <i>Computer systems and products</i>	\$62.71 B	6.9% of total rev- enues	27,000	L.J. Ford VP/Information & Telecom- munications Systems	IS, Gen. mgmt., Mktg.	Sr. VP	2	26	2
IKEA International A/S Humblebaek, Denmark <i>Retail furniture</i>	\$3.0 B								
	additional information not available								

Lan-Locked?



Introducing PathWay, a fast way off the isle of LAN.

PathWay gives your desktop computer easy, open access to the network resources in your corporation.

And it uses multi-vendor standards so you can't get stranded.

Share files, printers, information and resources between the islands of automation in your company.

The latest in client/server computing from the leader in multi-vendor connectivity, PathWay supports the widest range of system platforms, including DOS, UNIX System V, VAX/VMS, SUN OS, ULTRIX, OS/2 and Macintosh.

For the distributor nearest you, call 1-800-872-8649 (in California: 1-800-962-8649) or write The Wollongong Group, Inc., 1129 San Antonio Road, Palo Alto, CA 94303.

PATHWAY
FROM
WOLLONGONG

©1989 The Wollongong Group, Inc.
All other product names are the trademarks of their respective manufacturers.

COMPANY/LOCATION/ LINE OF BUSINESS	REVE- NUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/ TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Intel Corp. Santa Clara, Calif. <i>Microcomputer components</i>	\$3.1 B	\$100 M	600	Neal Franking Mgr./Corp. IS	IS	Head of Admin.	2	15	2
Johnson & Johnson New Brunswick, N.J. <i>Pharmaceuticals</i>	\$10 B	\$50 M	300	Raymond L. Giovannelli VP/Information Services Div.	IS, Acct., Ed., Eng., Fin., Gen. mgmt., Mktg. & Ops.	VP/Information Technology	3	28	8
Kimberly-Clark Corp. Dallas <i>Consumer products</i>	\$5.7 B	1.6% of total rev- enues	500	John T. Kohler Sr. VP	IS & Finance	CEO	1	4	4
Kyocera Corp. Kyoto, Japan <i>High technology</i>	\$2.5 B	additional information not available							
L.L. Bean Inc. Freeport, Me. <i>Mail order</i>		\$10 M	125	Horace Gower VP/Information Services	IS	COO	2	15	5
Levi Strauss & Co. San Francisco <i>Apparel manufacturing</i>	\$3.6 B			R.W. (Bill) Eaton Sr. VP & CIO	IS, Gen. mgmt. & Govt.	COO	2	12	2
Lotus Development Corp. Cambridge, Mass. <i>Software products</i>	\$556 M		135	Richard Weissberg & Gene Cort Directors/IS & Support		CFO	2		
MCI Communications Corp. Washington <i>Telecommunications</i>	\$6.5 B	5% of to- tal rev- enues	1,700	Allan Ditchfield Sr. VP/Systems Eng.	IS, Eng., Fin., Gen. mgmt., Govt., Mktg., Sales, Ops., Ed.	Exec. VP	2	4	2
MIPS Computer Systems Inc. Sunnyvale, Calif. <i>Computer systems</i>	\$104 M	\$3 M	14	David C. Berg VP/MIS	IS, Eng., Gen. mgmt. & Ops.	CFO	2	6 mos.	6mos.
Merck & Co. Inc. Rahway, N.J. <i>Pharmaceuticals</i>	\$6.7 B	\$80 M	702	A.C. Cinorre VP/Computer Resources	Acct., Fin., Gen. mgmt.	Sr. VP/Eng. & Technology	3	23	6.5
Mercury Stainless Corp. Wheeling, Ill. <i>Steel products</i>	information not available								
Microsoft Corp. Redmond, Wash. <i>Software products</i>	\$1.2 B	\$40 M	100	Neil Evans MIS Dir.	IS, Acct., Fin.	CFO	2	7	7
Milliken & Co. Spartanburg, S.C. <i>Textile products</i>				John H. Gieser Information Services Dir.	IS & Engineering	CFO	3	10	1
Millipore Corp. Bedford, Mass. <i>Separation technologies</i>	\$657 M			Michael P. Carroll VP/Information Services	Accounting	CFO	2	4	1.5
Motorola Inc. Schaumburg, Ill. <i>Electronics</i>	\$9.6 B	4-6% of total rev- enues	2,000 +	Les Shroyer Corp. VP & Dir./MIS & Tele- communications	IS & Engineering	Chief Staff Officer	2	6	1
Mrs. Fields Inc. Park City, Utah <i>Specialty retail bakery</i>	\$180 M (sales)	1% of to- tal rev- enues	20	Randall K. Fields , Chairman & CEO; Paul Quinn , VP/MIS					
NEC Corp. Tokyo <i>Electronics</i>	\$10 B	*0.9% of total rev- enues	800	Yukio Mizuno Exec. Dir.	IS, Eng., Gen. mgmt. & Mktg.	COO	2	37	5
New England Medical Center Boston <i>Health care and research</i>		\$4.1 M	60	Jeffery Tarte VP/Information Services	IS	CEO	1	6 mos.	6 mos.
Nintendo Co. Ltd. Kyoto, Japan <i>Consumer electronics</i>	\$140 M	additional information not available							

COMPANY/LOCATION/ LINE OF BUSINESS	REVE- NUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/ TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Nippon Steel Corp. Tokyo <i>Steel production</i>	\$2.3	additional information not available							
Nissan Motor Co. Ltd. Tokyo <i>Automobiles</i>	\$26.2 B		1,500	Takashi Sato Member of the Board of Directors	IS & Purchasing	Top management committee	4	31	2
Otis Elevator Co. Hartford, Conn. <i>Elevators and escalators</i>	\$3.3 B	\$80 M	650	Donald Lucas VP/IS	IS & Engineering	COO	2	3	1
The Procter & Gamble Co. Cincinnati <i>Consumer products</i>	\$21.5 B	\$235 M	2,100	Robert J. Herbold Sr. VP	IS & Marketing	Exec. VP	2	22	3
The Progressive Corp. Mayfield Heights, Ohio <i>Property and casualty insurance</i>	\$1.16 B	\$55 M	500 +	currently vacant		COO	2		
Reynolds Metals Co. Richmond, Va. <i>Aluminum products</i>	\$6.2 B	\$23 M	250	James T. Matsey Corp. Dir./IS	IS, Acct., Fin. & Gen. mgmt.	CFO & Exec. VP	2	20	8
Rubbermaid Inc. Wooster, Ohio <i>Plastic products</i>	\$1.3 B	\$14 M	163	Joseph Balnave VP/Corp. MIS	IS, Eng. & Mktg.	COO	2	7	7
SAS Airline Stockholm, Sweden <i>Air transportation</i>	\$5 B	\$170 M	1,000	Bjorn Boldt-Christmas VP	IS, Eng. & Gen. mgmt.	COO	2	3	3
AB SKF Göteborg, Sweden <i>Rolling bearings</i>	\$4.1 B	\$100 M	910	Håkan Landahl Dir./Group IS	IS, Org. & Admin.	CFO	2	18	12
S-K-I Ltd. Killington, Vt. <i>Resorts</i>	\$90 M	\$1.3 M	20	Ivars "Ike" Eichvalds Mgr./Management Information Services	IS, Acct., Ed., Fin., Gen. mgmt., Mktg. & Ops.	CFO	2	6.5	6.5
Seibu Saison Group Tokyo <i>Retailing</i>	information not available								
Shiseido Co. Ltd. Tokyo <i>Cosmetics and personal care products</i>	\$3 B (consolidated net sales)		170	Masatoshi Takemoto General Manager/IS Div.					
Sony Corp. Tokyo <i>Consumer electronics</i>	\$16.7 B		250						
Spire Corp. Bedford, Mass. <i>Electronics</i>	\$19.5 M			Robert D. Evans Dir./Systems & Planning	Eng., Gen. mgmt., Govt., Ops. & Sys. planning	CEO	1	6	1
St. Joseph Health System Orange, Calif. <i>Health care</i>	\$550 M	\$10.4 M	135	Jerry M. Harpole Asst. VP & Dir./Information Services	IS, Eng. & Gen. mgmt.	CFO	3	3	3
Statoil Stavanger, Norway <i>Oil exploration and refining</i>	information not available								
Stew Leonard's Norwalk, Conn. <i>Retail food</i>	\$108 M	\$500 + K	2	Jeff Pirhala Dir./DP	IS & Ops.	Exec. VP/Ops.	2	12	12
Stride Rite Corp. Cambridge, Mass. <i>Footwear</i>	\$454 M	\$6 M	58	John Piasecki VP/MIS	IS & Fin.	CFO	2	10	7



Others may copy our DEFINITY system, but they can't copy what's behind it.

The AT&T DEFINITY®
Communications System



*It all began
right here.*

has attracted an
avid following
since its debut
just a year ago.

Customers study its ability
to grow, to end obsoles-
cence, and to protect criti-
cal telecom investments.
Competitors just study it.

Our secret? People.

The modular DEFINITY sys-
tem is an offspring of
AT&T Bell Laboratories,

born of the
brightest, most
innovative R&D

minds in the
entire world.

Behind each

system stands
the largest sup-

port battalion in our industry—

over 13,000 experts in
Manufacturing, Product
Design, Sales, Customer



*The modular DEFINITY system grows
from 40 to 30,000 lines, and beyond.*

Service, AT&T Credit Corpora-
tion, and other specialties.

We never sleep. Many of

our people work through the
night, every night. They can

monitor the condition
and performance of
your DEFINITY system

remotely, 24 hours a day.

We also offer an around-the-
clock repair line.

But what if... Wizards

at our Remote Maintenance
and Testing Service torture

*Our RMATS
staff is
always
thinking.*



DEFINITY software, fixing
things that you didn't even
know needed fixing.

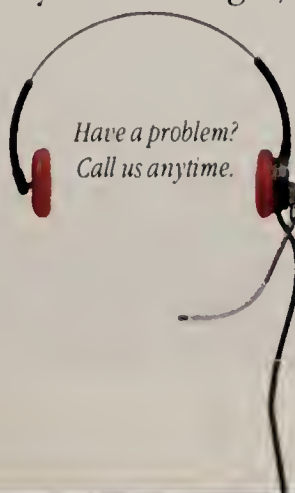
The people behind
our DEFINITY system make

it superior. They also guarantee
that it can never be duplicated.

To learn more, contact your
AT&T Account Executive or call
us at 1 800 247-1212, Ext. 362.



*AT&T designers built
critical ISDN technology
into the system.*



*Have a problem?
Call us anytime.*



AT&T

The right choice.

COMPANY/LOCATION/ LINE OF BUSINESS	REVE- NUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/ TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Sun Microsystems Inc. Mountain View, Calif. <i>Computer systems</i>	\$1.8 B			Michael A. Graves VP/Information Resources	IS & Mktg.	VP/Corp. Resources	2	3	3
Texas Instruments Inc. Dallas <i>Electronics</i>	\$6.5 B	\$200 + M	2,500 +	Ralph J. Szygenda VP/Information Technology Group	IS, Eng., Gen. mgmt., Govt. & Ops.	Pres./IT Group & VP/Texas Instru- ments Inc.	3	18	1
Thermo Electron Corp. Waltham, Mass. <i>Manufacturing</i>	\$579 M	\$1 M	11	John Giansante Mgr./Corp. Data Center	IS & Ops.	CFO	3	8	4
Thomson Tour Ops. Ltd. London <i>Tour operations</i>			105	Brian Eatock Systems Dir.	IS	CEO	1	6 mos.	6 mos.
Toray Industries Inc. Tokyo <i>Plastics, chemicals and pharmaceuticals</i>	\$5.9 B (consoli- dated net sales)	0.8% of total rev- enues	350	Tadao Ito Gen. Mgr./IS	IS	Head of technol- ogy center	2	30	2
Toshiba Corp. Tokyo <i>Electronics</i>	\$20.4 B (noncon- solidated net sales)		1,400	Koji Okamoto	IS & Engineering	President	1	30	1
Toyota Motor Corp. Toyota City, Japan <i>Automobiles</i>	\$47.9 B		600						
Turner Broadcasting System Inc. Atlanta <i>Entertainment</i>	\$1.065 B	\$7.4 M	79	Michael F. Johnson Corp. Dir./Management Information Services & Telecommunications	IS, Fin., Gen. mgmt., Govt. & Consulting	VP, Controller & Chief Acct. Officer	3	2.5	2.5
USAA San Antonio, Texas <i>Insurance</i>	\$3.8 B	\$190 M	1,750	Donald R. Lasher Pres./Information Services Div.	IS, Eng., Gen. mgmt., Govt. & Ops..	Chairman & CEO	1	5	5
U.S. Army Health Services Command Fort Sam Houston, Texas <i>Health care</i>		\$65 M	700	Col. Richard J. Strachan Deputy Chief of Staff/ Information Management	IS, Ed., Eng., Fin., Gen. mgmt. & Ops.	CEO	1	20	3
The Valspar Corp. Minneapolis <i>Coatings manufacturing</i>	\$528 M	\$4 + M	33	Steven E. Clark MIS Dir.	IS, Ed., Mktg. & Purchasing	VP/Corp. Services	3	11	2
Wal-Mart Stores Inc. Bentonville, Ark. <i>Retail department stores</i>	\$25 B			Bob L. Martin Sr. VP/Corp. IS	IS & Gen. mgmt.	COO	2	5	4
Walt Disney Co. Burbank, Calif. <i>Entertainment</i>	\$5 B	*\$97 M	*710	Sharon D. Garrett VP/Information Services	IS & Fin.	CFO	2	1	3 mos.
Wells Fargo & Co. San Francisco <i>Financial services</i>	\$600 M	additional information not available							
Westinghouse Electric Corp./ Commercial Nuclear Fuel Div. Pittsburgh <i>Nuclear fuel</i>		\$15 M	66	William M. Whitaker	IS, Acct. & Eng.	Mgr./Energy Sys. Business Unit	5	21	5
White Memorial Medical Center Roseville, Calif. <i>Health care</i>	\$173 M	\$2.7 M	13	Hilton Raepfel Dir./Planning		VP/Business Development	2		
Xerox Corp. Stamford, Conn. <i>Office communications</i>	\$12.2 B	\$500 M	3,000	Patricia C. Barron VP/Corp. Information Management	Ed., Gen. mgmt. & Mktg.	Exec. VP	2	12	3

*Does not include telecommunications



This isn't the only way to join two different systems.

It took 28 years and a lot of sledgehammers for this barrier to come down. Bringing two very different systems together as one.

Now, Software AG has a way to do the same for yours.

With our NATURAL application development environment, we give you something you've never had before: freedom. The freedom to choose the

hardware vendor that works best for you. Whether it's IBM, Digital, Wang or Siemens. The freedom to change systems, anytime, with no loss of investment in your applications. And the freedom to exchange ideas and information among all your offices. Across all your systems.

So whatever system you work under, IBM, DEC, Communist or Capitalist, NATURAL has a way to unite them all

into one powerful force. For more information, call 1-800-843-9534. (In Virginia, call 703-860-5050; in Canada, call 519-622-0889.)

Your success is how we measure ours.

 **SOFTWARE AG**

**Who trains its
temporary office
workers to operate
30 software programs
on 8 different brands
of equipment*?**

Manpower!

and nobody else.

*Including:

AS/400 Office, DisplayWrite/36, Query,
IDDU, DisplayWrite/370, PROFS, DisplayWrite 4.2,
WordPerfect 5.0, Aldus PageMaker,
Microsoft Word



If you need smart temporary replacements
or end user training call:

MANPOWER®
TEMPORARY SERVICES



MANAGING INNOVATION (vi) **1:** the art of leaving little to chance while also supporting the freedom to experiment; **2:** the skills needed to achieve this seemingly contradictory aim; **3:** a system to support and reward those who produce results

CONTROLLED FUSION

BY KATHLEEN MELYMUKA

IT TAKES SUPERIOR management to do away with stifling traditional structures and let innovation bloom within a corporation. By flattening hierarchies, improving communications, automating mundane tasks and empowering individuals, many of this year's CIO-100 companies speed, streamline and refine information, and thereby facilitate change. Information technology supports these strategies in a variety of ways.

Nothing speeds the flow of information and empowers individuals like a flattened organization, and nothing helps flatten an organization like a well-managed electronic-mail system. At **Mrs. Fields Inc.**, the Park City, Utah, bakery chain, an E-mail system keeps Chairman and CEO Randy Fields in such close touch with his employees that he doesn't need regional or district offices. "The technology we use allows us to have a bare-bones level of management," said Fields.

E-mail has blurred the lines between management levels at **MCI Communications Corp.**, the Washington-based telecom company whose employees have electronic access to top-level management. "We could talk about democracy,"

laughed Allan Ditchfield, senior vice president of systems engineering, "[but] sometimes it's anarchy."

E-mail not only speeds the flow of information; it changes the way companies do business, according to Gene Cort, co-director with Richard Weissberg of information systems and support at **Lotus Development Corp.**, in Cambridge, Mass. "When you can move information quickly," he said, "it allows you to be more of a risk-taker."

Risk-taking is a way of life at the headquarters of the **U.S. Army Health Services Command** at Fort Sam Houston, Texas, according to Chief of

then disseminate information about successes through an E-mail network of 82 subordinate commands that include 37 army hospitals, 37 dental operations and 52,000 people.

Swedish ball-bearing maker **AB SKF** (see profile, Page 71) uses an IT network to manage a newly decentralized worldwide operation. Besides communications, the network supports forecasting; master planning and scheduling; manufacturing support, control and planning; and customer service. "[We] operate these systems on a local basis and a global basis, so all our data centers are connected," said Håkan Landahl, director of

.....
Mrs. Fields' information system "allows employees to be free of most of the paperwork and numbers and focus on being with their customers."

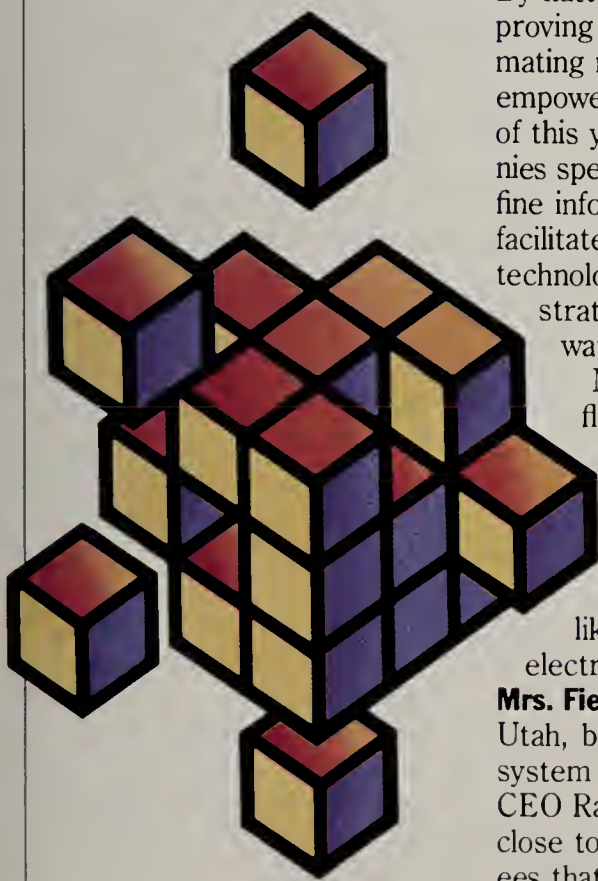
—Randy Fields

.....

Innovation Lt. Col. Ken Andrews. The command's corporate culture is expressed in the exhortation to " 'risk failure; we want your ideas,' " said Andrews. He and a network of innovation officers at each subcommand solicit innovative ideas from the rank and file, help develop them, and

group information systems. "The integration is not just local but international."

Innovation doesn't bloom in a vacuum. By relieving workers of tedious tasks, IT helps management provide an environment that fosters creativity. "Creativity comes from people, not technology," said



Randy Fields. "The technology frees people to be more creative."

At Mrs. Fields, just keeping the cookies cooking could take all the attention of employees if it weren't for IT. "The system that we have in place in every store handles almost everything, [including] how much cookie dough to bake, labor schedules, sales analysis, repair and maintenance, [and] interviewing potential Mrs. Fields employees," said Fields. "It allows [employees] to be free of most of the paperwork and numbers and focus on being with their customers."

Aside from freeing employees from mundane tasks, IT helps them to focus on the critical. For example, at Lotus, individual hard-copy sales reports used to be consolidated by managers and passed up through the ranks. "Eventually, a long time later, the whole thing would end up as an inch-thick report back at headquarters," said Weissberg. "We would use a lot of trees to copy these things and give them to all managers. They were late and nobody read them anyway." Today, sales reps key their reports into a system that consolidates them into Lotus Notes. A Notes database allows managers to focus on areas of interest. "Every person can cut right to the meat of what they want to see," Weissberg said.

At **Cypress Semiconductor Corp.**, of San Jose, Calif., managers monitor their own performance with an IT-based system that measures their achievements against weekly objectives. Managing Cypress's growth is also a major concern of President and CEO T.J. Rodgers, and he anticipates that the past successes of the company's management-oriented IT systems will be cloned within spinoff organizations.

The corporate office at **Thermo Electron Corp.**, of Waltham, Mass., uses IT in deci-

sions about mergers, acquisitions and new businesses.

Information from public financial databases is used to create private ones, said John Giansante, manager of the corporate data center. An EIS consolidates the financial information, and a decision-support system summarizes the data for executives' consideration.

Cypress uses an EIS in its daily review of business. Information on bookings, backlogs, shipments, business plan and progress is available at a glance to any manager who attends. According to Rodgers, "My ability to raise any data I want in any area at any time means it's not real healthy to bullshit the Prez."

Nothing is more important in today's dynamic business environment than the ability to manage change. At **Millipore Corp.**, a Bedford, Mass., maker of filtering devices, change is a way of life made possible by IT. Vice President of Information Services Michael P. Carroll explained: "Our worldwide sales-analysis system lets you understand your business to a very fine degree of granularity. It is also highly flexible. As the business conditions change, we can refocus our business unit."

For example, if sales data on a particular product indicates a problem, a different sales force may be assigned that product, and the system can give the new team all the product history and information it needs to get moving quickly, rather than having to go through a long transition process.



SNAPSHOT: Corning Inc.

Blending IS and Business

The IS function has been so thoroughly fused with Corning's business units that its contributions may soon become as transparent as glass

Innovative management of information services has taken Corning Inc. to IS nirvana: Not only is IS totally integrated with business, but the IS structure encourages and supports innovation in every business unit. In fact, IS innovation is leading the way in leveling the organization, improving communication and empowering workers.

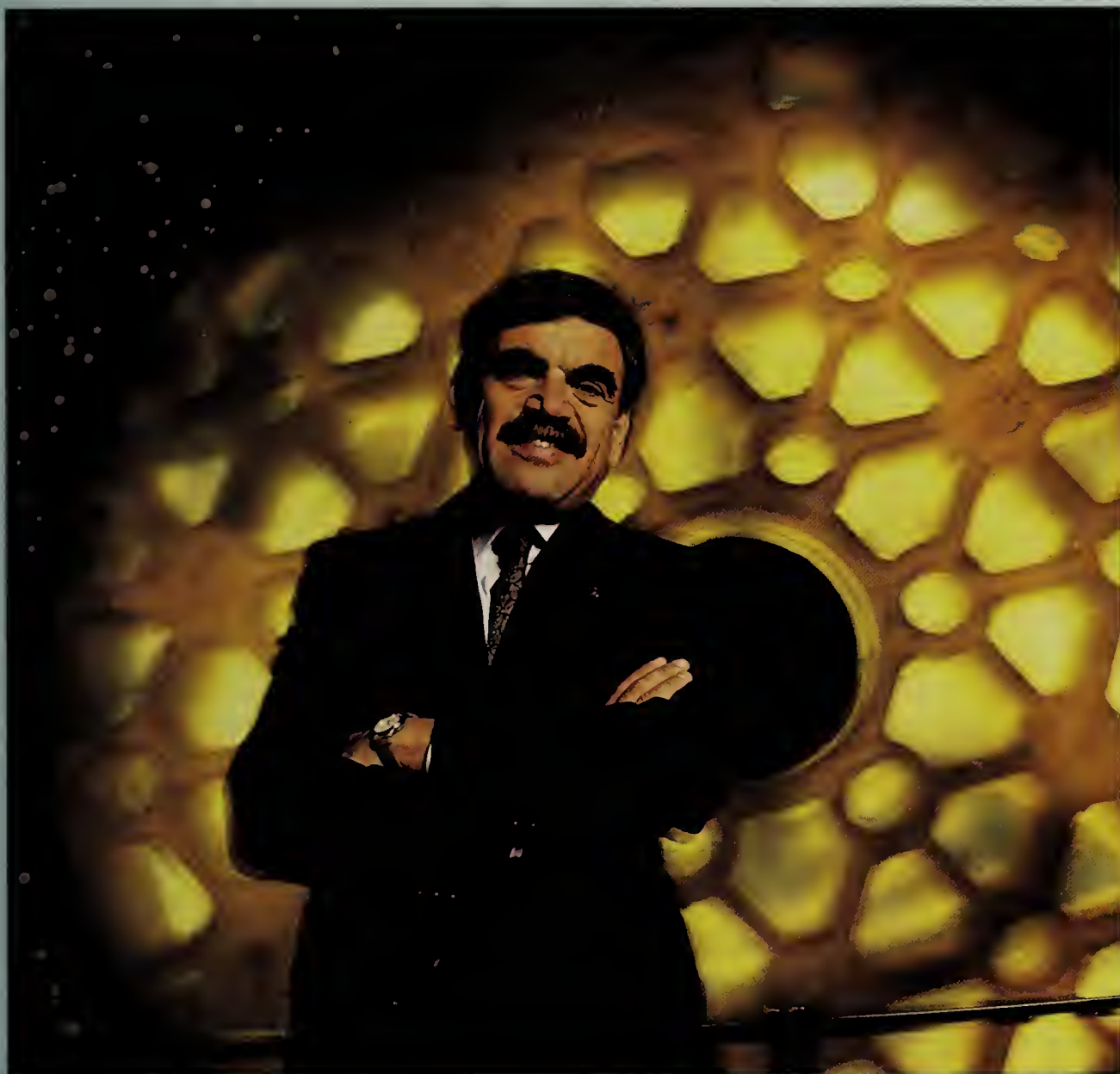
"In the last four or five years, I've seen IS go from a back-room techie support group to an integral part of operating units," said Harvey R. Shrednick, vice president of information services for the Corning, N.Y., glass manufacturer.

Shrednick has placed an IS business manager "within earshot" of the head of each business unit. His or her major responsibility is IS's relationship with the business unit manager and the unit's staff. Although still technically part of the IS function, for all intents and purposes "the IS person has become part of the business unit," said Shrednick. "They're viewed as business people with IS tools."

The IS business manager supplies strategic di-

rection and is responsible for the day-to-day internal customer-service needs of his functional group. The rest of IS supplies that person with the services and support needed to deliver solutions and services. The ties with the business functional unit are so close that in some cases, the IS person represents the business unit with external customers. The IS person assigned to the marketing unit, for example, built a relationship with outside distributors and came to know their needs so well that he set up a pilot voice-activated telephone system to help them track orders. "You can't tell what is an IS solution and what is a business solution, because they're one and the same," said Shrednick. "The lines of organizational responsibility are blurred, which is very positive."

IS also initiated the concept of self-managed work teams—an idea that is spreading through the company. Begun in the IS telecommunications and applications groups, the teams use IT to empower people and eliminate chains of command and levels of bureaucracy.



SHREDNICK: integrating IT into the business

Each person is responsible for communicating information directly with whomever needs to know rather than through levels of management. "They eliminated two levels of management and improved communications concerning what . . . happens in the computer room," said Shrednick. This, he said, "takes out levels of management, empowers people, improves morale, improves communication, expedites decisions and makes things happen."

Interestingly, the very integration of IT into the business poses a problem for Shrednick: It's difficult to prove how much IT

does for Corning. "We're so integrated into the business that it's difficult to pull it out and show how we contribute to business objectives," he explained. "We need to get better at marketing to top management the . . . contributions IT makes to quality, customer service and return on equity. We need to educate top management toward possibilities where IT could further an innovative approach."

Looking to the future, Shrednick hopes to build the same kinds of relationships with outside customers that IS has established with internal customers. "Right now, we view ourselves as busi-

ness partners with the internal customers," he said. "I don't think we've scratched the surface, [in terms of] creating similar levels of partnerships with external clients."

His approach: more face-to-face videoconferencing and "pen pal" arrangements, via E-mail, with counterparts in other companies. "The kind of rapport you build using E-mail, voice mail and video teleconferencing" is inimitable, he said. These technologies will form the basis of some "very key systems for the future. Companies that [use them] well will be the true competitors in the '90s."

—K. MELYMUKA

This flexibility breeds creativity. "We know we have this ability," said Carroll, "so we can become innovative when we suggest solutions, because we don't feel we have a limit on how we are organized. It's a key factor in innovation."

.....
Levi Strauss's "aspirations statement" is aimed at institutionalizing behaviors such as trust, openness, honesty and acceptance of diversity.

—Bill Eaton

.....
At **Levi Strauss & Co.**, the San Francisco apparel manufacturer, Senior Vice President and CIO Bill Eaton not only manages change; he and the executive management committee are demanding it through a long-term project aimed at transforming the corporate culture. As part of this effort, the committee drafted an "Aspirations Statement" aimed at institutionalizing behaviors such as trust, openness, honesty and acceptance of diversity. The company has established off-site seminars and internal courses for managers to "struggle with what the statement means and how we can make it a reality," Eaton said.

As the best-managed companies prove, it's not how much information technology you have, it's how you apply it. When IT supports creative management, it can help deliver an environment in which people feel free to experiment and innovation thrives. ☐

Kathleen Melymuka is a freelance writer based in Duxbury, Mass.

PHOTOGRAPH BY FOREST McMULLIN

In The Complex World Of A Simple, Practical



Information Management, Solution Has Emerged.



Introducing the Information Management Software solution from Computer Associates. It's built around three basic ingredients.

Proven, high performance database management systems.

Comprehensive software engineering solutions.

And the most important ingredient of all:

Availability.

Everything you need— everything you've been told you had to wait for—we have ready and available today.

Our relational database technology doesn't need to "mature."

CA-IDMS®/DB and CA-DATACOM/DB® support mission-critical applications at thousands of sites around the world.

In addition, CA's software engineering solutions are the most complete and tightly integrated available. They include the industry's most successful COBOL development environment, 4GLs, and application generators. With facilities to manage testing, maintenance, implementation and change control.

And with our Computing Architecture For The 90s, you'll be able



CA's Computing Architecture For The 90s protects and enhances the value of every CA software solution.

to achieve distributed processing across the widest range of multiple operating systems and hardware platforms. And our unique transparency software is only one of the ways CA90s protects the tremendous investment you've made in your present applications.

Altogether it's a simple, practical solution you can benefit from just when you need it the most.

Today.



For more information call 1-800-645-3003.
© 1990 Computer Associates International, Inc.,
711 Stewart Avenue, Garden City, NY 11530-4787

BANKERS TRUST KNOWS THE VALUE OF A 24-HOUR-A-DAY GLOBAL NETWORK.

A global data communications network from Northern Telecom has made every time zone in the world more accessible for Bankers Trust.

It provides 24-hour-a-day transfer throughout the world's financial centers. So moving cash, trading currency, and worldwide financing are faster, easier and under tighter control. And that makes them more profitable—a big advantage in today's intense international money markets. Their network is also a great investment for the future, because they can expand it almost anywhere, without replacing equipment.

Discover the benefits of our DPN family of packet switches, the data network that can grow with you. Call 1-800-NORTHERN. You'll find it's like money in the bank.



NORTHERN TELECOM

TECHNOLOGY THE WORLD CALLS ON

© 1990 Northern Telecom. DPN is a trademark of Northern Telecom.



BEING BIG, ACTING SMALL (*vi.*) **1:** gaining the advantages of being a small company; **2:** emphasizing entrepreneurship, flexibility and a lean management model that pushes decision-making to the front lines; **3:** remaining close and responsive to customers

WHEN ELEPHANTS FOXTROT

BY MEGHAN O'LEARY

WHOWER SAID, "small is beautiful," must have been a businessperson. For even as modern companies merge, acquire and go global, they increasingly emphasize the need to act small: to be responsive, to be familiar with all the details of the business, to be in touch with customers and, above all, to maintain the energy that so often

makes small companies tenacious and innovative. In fact, many innovative companies find that growth and the encroaching bureaucracy that frequently goes with it eventually dilute or even destroy the entrepreneurial, creative spirit that made them innovative in the first place.

Despite a company's desire to retain control by limiting size, some industries require growth to remain competitive. **The Valspar Corp.**, one of the top five North American paint and coating companies, has felt this pressure. "This industry has become global, . . .

especially in the last few years," said Steven E. Clark, the company's MIS director. "[It is a] relatively mature market. The bigger companies are getting bigger, and the smaller ones are disappearing." It is an industry in which survival requires growth.

Valspar, based in Minneapolis, combats the control problems associated with growth through its ability to quickly and efficiently integrate the companies it purchases. The company relies on centralized management to support this task, a structure reflected by its IS group, which, while centralized, provides distributed services via smaller IS groups at 24 manufacturing plants.

Other companies strive to keep in touch with widely dispersed operations through close attention to detail. By keeping close tabs on sales and inventory, the **Stride Rite Corp.** of Cambridge, Mass., a \$454 million seller of such footwear brands as Keds and Sperry Top-Siders, remains a "lean organization, an action-oriented company," said Vice

President of MIS John Piasecki. Stride Rite's systems are not sophisticated, Piasecki explained, but the company pioneered the use of UPCs in the footwear industry. It has been using EDI for more than three years and closely monitors sales and inventories at its own 250 retail outlets as well as in department and specialty stores.

Getting a grip on sales at local levels, ironically, can be a matter of exploiting one's size. About six years ago, **Frito-Lay Inc.** began to return to local and regional marketing while maintaining the leverage in purchasing and manufacturing that its size allowed. Frito-Lay has a self-managing field sales team of 10,000 employees that sends daily reports on inventory, deliveries and even stale products to headquarters in Dallas using hand-held computers. Once a week, salespeople receive status reports on all of their accounts, which enables them to spot the need for new or different products in their respective markets. According to Charles S. Feld, vice president of



ILLUSTRATION BY MARK FISHER

MIS, the company has dramatically expanded its product line since implementing the complex computerized marketing systems and the electronic links between regional sales offices and headquarters that support its new focus. The systems allow Frito-Lay to quickly determine what is selling and reposition or eliminate products as necessary.

Another company that leverages its size to act smaller is **Digital Equipment Corp.** of Maynard, Mass., one of the largest companies in the world that is still managed as a single entity. Digital continually increases its emphasis on speed and leanness, and it effects both through its ability to reach its employees and communicate globally, according to Dan Infante, vice president of information management and technology. Over the last seven years, Digital has been able to cut manufacturing cycle times and reduce inventory and manufacturing staff while growing 150 percent. Infante credits Digital's worldwide private network with enabling this process. According to Infante, the network helps Digital act locally by using resources wherever it has them, and yet the global cohesiveness to act as a single corporation.

Thermo Electron Corp.'s large size allows the Waltham, Mass.-based diversified technology company—which has been called “a perpetual idea machine” by one Wall Street analyst—to incubate new lines of business in its central R&D lab and then spin them off into largely autonomous subsidiaries. Although Thermo Electron did \$579 million in revenues last year, it endeavors to “maintain the entrepreneurial spirit of a small company,” according to John Gian-sante, manager of the corporate data center. This spirit can be seen in the encouragement and autonomy that Thermo Electron gives its employees to experiment with

new business ideas.

Large service-oriented companies often find that business must be nurtured at the front end. **Wal-Mart Stores Inc.** stays ahead of the game by pushing responsibility for decisions and quality of service as close to the point of impact as possible. This \$25 billion company based in Bentonville, Ark., strives to achieve a level of service in each location that customers might find in a much smaller retail store, from reducing the amount of time customers wait in line to stocking products based on local demand. Empowered by time-saving scanning, authorization and analysis systems, Wal-Mart's store managers (or “associates”) can be more autonomous and entrepreneurial, according to Bob L. Martin, senior vice president of corporate information systems.

One quality necessary to create the illusion of smallness in customer service is the consistency in applications that allows a company to be cohesive and act as a single unit. **AB SKF**, a Swedish manufacturer of anti-friction devices based in Göteborg (see profile, Page 72), accomplishes this through standardized business procedures worldwide and the assignment of global responsibility for each product line.

“We have based all the major items [—forecasting, planning, scheduling, manufacturing support and control, and worldwide customer service—] in one chain with common systems built throughout [each] division, implemented in each local company, [and] tied together with a global network,” said Håkan Landahl, director of group information systems. SKF includes five divisions, 50 subsidiaries and 7,000 distributors, and does business in 130 countries. Still, a customer calling any SKF outlet can get information about the availability of any product anywhere in the

SNAPSHOT: Millipore Corp.

Computer-Aided Smallness

Tightly controlled IT is a crucial enabler of this decentralized niche player's nimble approach to its many technical markets

According to Millipore Corp. of Bedford, Mass., a maker of devices for purifying and analyzing liquids and gases, in order to be a player in what it calls the “separations” business, one must first understand integration.

The \$657 million company has shown that operating on some levels as a single large entity allows it to maintain the operating agility, high levels of customer service, organizational flexibility, and entrepreneurialism of a smaller company. Millipore accomplishes this with four independent business units that are, nevertheless, integrated and allowed to be interactive via a common corporate information system. With this shared resource in place, Millipore is determined to grow without

losing the entrepreneurial spirit that has led it to success in developing products for technical niches.

The groundwork for this niche strategy can be found in Millipore's emphasis on such small-company attributes as customer service. Customer contact is a major thrust at Millipore, according to Vice President of Information Services Michael P. Carroll.

Millipore not only encourages customer visits and inquiries about product quality and service, but it involves all employees in customer service through training programs, encouraging the use of appropriate technology tools, and setting measurable goals for customer satisfaction.

Millipore's decentralized structure is another key to

world. SKF has achieved an international integration that allows each unit of the company to behave locally in any world market.

A similar standardization of business procedures has enabled **Cypress Semiconductor Corp.** of San Jose, Calif., to grow while working with thousands of factors about the business and assigning accountability at all management levels. At Cypress the culture

is ruled by a system in which project teams and managers alike set objectives and have their progress evaluated weekly. The company engenders this sort of control through what it calls the Five O'clock Meeting, a weekly mini business review of bookings, backlogs, shipments, business plans and progress by managers and the company's president, T.J. Rodgers. Virtually any data on



CARROLL: Millipore's success "comes from finding a lot of little niches."

its success because, while tightly integrated, the company allows each of its business units to respond to the market without the weight of a corporate bureaucracy. Such small, focused business units allow employees to be entrepreneurs and to keep innovation as a top priority.

The clearest benefit of

this approach, Carroll pointed out, is that more contact and better information about customers and markets give the company a better understanding of the playing field. He added that information technology is essential to Millipore's ability to share such information in its decentralized environment. "The company can't afford

to lose control of this information," he said. "If people thought they'd lose control of information by setting up entrepreneurial units, they wouldn't do it."

Such tight control of information gives Millipore the flexibility of a small company by allowing it to define business units more by logical needs

than by actual physical boundaries. The importance of this sort of adaptability can be seen in Millipore's worldwide sales-analysis system, which, said Carroll, "allows us to understand the sales of a particular product on a very current basis worldwide. If that information indicates a problem in that product, . . . we may decide—since we are [organized] by sales forces—[that] another sales force may be able to better address that product in a particular market."

"If we want to form new organizations," he continued, "we can do that very quickly. We can become innovative when we suggest solutions because we don't feel we have a limit on how we are organized."

Innovation has so far ensured Millipore's success in technical niches. "We feel that [has been] possible because [each] small unit really understands its customers," Carroll said. "Each of our products addresses a small, particular niche." Millipore's future growth, he added, reflects its organizational philosophy that small is better. It "comes from finding a lot of little niches, not finding a big, new, blockbuster product." —M. O'LEARY

each project group's performance is available at these meetings via a database and computerized analysis tools, according to Rodgers. In this way, the semiconductor manufacturer operates like a much smaller company: Everyone knows what everyone else is doing. The amount of information Cypress executives have access to allows them to detect problems early and react immediately.

Managing the company's growth is of major concern to Rodgers. "Our business is on the threshold of unmanageability right now," he said. "A \$200 million semiconductor company with this philosophy [of closely monitoring progress] is extremely difficult to manage. We feel that we can either continue to fight the [information] war until we get to a Cray on every desk, or we can start breaking the

problem down." As a means to this end, Cypress has funded four mirror-image subsidiaries and is currently evaluating the possibility of breaking the original organization down into smaller companies. "Now that I know how to run a company," Rodgers explained, "I'll simply impose the systems that [have been proven to] work on the subsidiary companies, and based on the zoom capabilities of our sys-

tems [to examine operations in great detail], I'll be able to watch over those companies and make sure they're staying on top of the process."

The key to being a big, nimble, innovative company, according to most CIOs, is cultural—the ability to retain an entrepreneurial environment wherein employees have responsibility for making decisions and are encouraged to think and be creative. [CIO]

New R:BASE® 3.0 speeds up application development.

Built-in code generating power does routine, time-consuming work automatically, freeing developers to concentrate on customization. And with R:BASE 3.0's powerful application generator, Application EXPRESS, your prototype actually becomes the application.

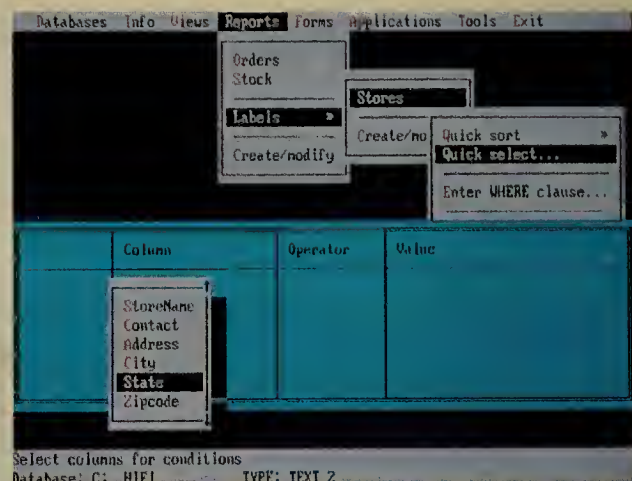
Easy to build, modify and use applications.

With R:BASE 3.0's intuitive interface, non-programmers can easily adapt screen displays, reports and forms to meet their changing needs.

100% ANSI Level 2 SQL. ANSI Level 2 Structured Query Language is fully integrated into R:BASE 3.0. Unlike some DBMSs, no translation of SQL commands is required.

Free Corporate Evaluation Kit. Check out R:BASE 3.0 for yourself. Call 1-800-248-2001 ext. V11 before September 30, 1990 to receive a free Corporate Evaluation Kit. R:BASE 3.0 comes with a no-questions-asked, 90-day money-back guarantee.

Attention: Unregistered R:BASE users! Get a registered copy of new R:BASE 3.0 for the same low discounted upgrade price as registered users. Call 1-800-248-2001 for your nearest participating dealer.



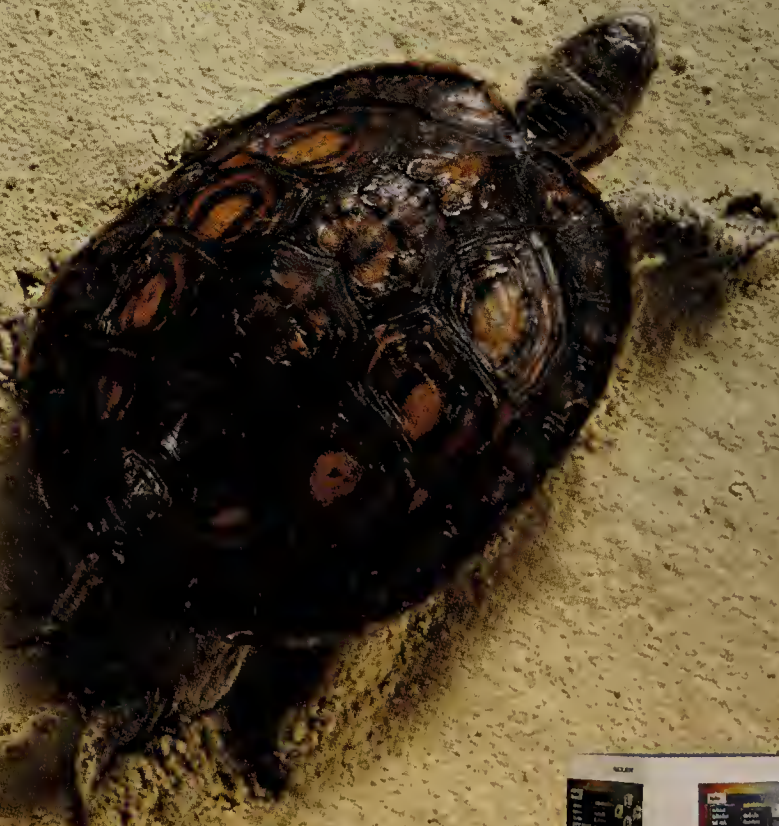
R:BASE 3.0's CUA style menus put all the functionality you need on the main screen. Cascading menus, dialog boxes and information lines give you a visual map of where you are, where you've been and where you're going.

NEW R:BASE 3.0

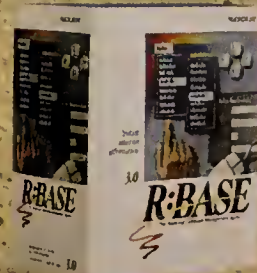
FROM MICRORIM



IS YOUR MIS DEPARTMENT GAINING A REPUTATION?



THE DATABASE THAT
RUNS ON COMMON SENSE.



Copyright 1990 Microrim, Inc. R:BASE is a registered trademark of Microrim, Inc. 3925 159th NE, Redmond, WA 98052 USA.
Microrim Nederland BV, Beukenhof 1st Building, Jupiterstraat 210-212, 2132 HJ Hoofddorp, The Netherlands. Tel. 011-31-25 03 41 190



SPEED TO MARKET (*n.*) **1:** the ability to act when opportunity knocks, if not sooner; **2:** using systems to integrate processes; **3:** never reinventing the wheel; **4:** relentlessly searching for ways to streamline every operation

BEATING THE CLOCK

BY MEGHAN O'LEARY

THE MARKETPLACE today is sending a Napoleonic message to all businesses: "Ask me for anything, except time." People in a hundred different industries will tell you the same thing: Speed, response time, timeliness—they're the essence of competitiveness in all but the most exclusive or static markets.

Companies in mercurial technical markets concentrate on getting products from design to production quickly.

Companies in mature markets are concerned with getting new products out the door or getting old products to customers faster. Still others find that speed helps them to overcome the limitations of being very small or very large.

Speed is almost always a priority in the design of a product. Invention and collaboration take time, but in high technology, where the next iteration of a product can mean obsolescence for the last generation, sluggishness can put a company out of business. Companies such as **Intel Corp.** of Santa Clara, Calif., and **Texas Instruments Inc.** of Dallas, have expedited the design process by approaching it as an integrated dialogue rather than as a sequence of sepa-

rate engineering and design phases. By giving engineers and designers electronic mail, shared databases of development information, and engineering workstations, Intel has been able to cut confusion and iterations from the development process and reduce its development cycles for some products from years to weeks. Through IT, the company gives its engineers and designers a forum in which to share the development process, so that any progress on a product can be reflected in the working model instantaneously.

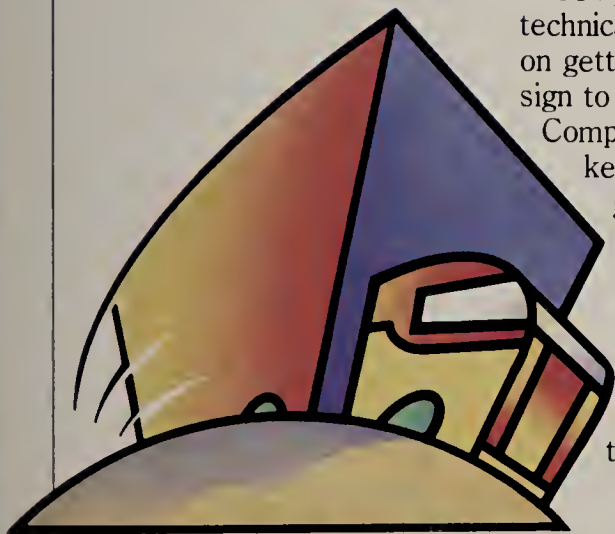
Texas Instruments has reduced development cycles with the same kinds of tools, eliminating redundancy and wasted effort from the design process, and fine-tuning it each time around. As a result, TI's engineers can often create working models of products on the first iteration.

The keys to speed at both companies are design databases containing a wide range of information, from accounts of development travails to recorded market histories. Designers and engineers use this information to build on past experiences when developing new products. Used in conjunction with high-powered workstations that simulate chip performance, these databases greatly speed the development of working silicon

models of chips.

Companies in emerging markets have an advantage over companies in mature ones in that their ability to innovate allows them to exploit the industry. **Corning Inc.** in Corning, N.Y., for example, helped to ignite the fiber-optic market at a time when it was experiencing explosive growth. With the development of its own fiber-optic network, Corning improved internal communication and hastened the movement of information between members of work teams developing fiber-optic products worldwide. This accelerated development by allowing the work teams independence and flexibility, while still giving project managers a way to monitor progress.

The network was built by the company's Telecommunications Products Division to connect R&D and engineering groups in France, Japan and New York. According to Harvey R. Shrednick, the company's vice president of information services, the network itself was a testament to Corning's faith in the new technology. Researchers and engineers now use the network and CAD workstations with high-speed graphic capabilities to share graphics. Project managers use software tools to track individual projects and converse with team



members via electronic mail. Shrednick says the network has eliminated some reporting structures and much of the paperwork that slows down development.

Paperwork is a major time-waster at many companies.

Spire Corp., a thin-film manufacturer in Bedford, Mass., has become expert at dealing with paper because it derives half of its revenues from government research grants and contracts. Spire competes with other companies to develop products for aerospace and defense projects, according to Roger G. Little, president and chairman of the board.

Companies competing for government jobs are required to respond to requests for proposal (RFPs) within 25 days. A single proposal, however, involves a complex review process requiring meetings, authorization, sign-offs, scheduling, costing, research of past proposals and even outside printing. Still, in 1989, Spire produced about 300 proposals. The company also regained market share in one of its product lines, in part as a result of its improved response times to RFPs.

Spire's accelerator in this is its Publications Department, which acts as a corporate nerve center—a central information coordinator responsible for tracking RFPs and the R&D that goes into each proposal. Every step of a proposal is cleared through the department, which uses Wang computers to manage the process. The company also has a quality-control program that helps to streamline and eliminate inefficient procedures.

While speed in fast-paced technical markets is understandably important, more commonplace and mature markets have their pacesetters, too. In household items, for instance, a few companies always seem to be first in line with new and better products every year—think of **3M's**

Post-it Notes and **Rubbermaid Inc.**'s durable trash baskets and dust pans. Companies such as these excel at introducing new ideas and improving old ones ahead of the market. In this sense, they are as much idea manufacturers as product manufacturers. They make it their business to foster an environment in which new ideas are encouraged, and getting them to market is a corporate goal.

Rubbermaid, based in Wooster, Ohio issued a mandate that 30 percent of each year's revenue must be derived from products that didn't exist five years before, according to Joseph Balnave, the company's vice president of corporate MIS. Since establishing that goal, Rubbermaid has reduced the time it takes to develop new products and make new molds by five to 15 percent. The company gives its employees automated tools that allow them to focus on development rather than repetitive tasks. **3M**, of St. Paul, Minn., has accelerated product development by offering any employee with a successful product idea a cut of the profits.

The right motivation can make employees more productive, but speed in development is difficult to achieve in a widely distributed company where the components for a product in progress might be in stock hundreds or thousands of miles away. For this reason, **IBM Corp.**, headquartered in Armonk, N.Y., has centralized the information end of finding, ordering and sending inventoried parts, and it has shortened the process from 90 days to 20 days in its attempts to hasten product delivery. The company has also given employees access to information on parts-availability from any IBM facility in the world and reduced inventories and the resources required to do the matching. This bureaucracy weight-loss was accomplished via a world-

SNAPSHOT:

Alza Corp.

Fast, Fast, Fast Relief

A pharmaceutical supplier uses IT to help combat 'information float'—the time that elapses between getting a good idea and actually putting it to work

G. V. Fulscher is tackling a business problem many corporations have experienced but few have identified. He calls it "information float," referring to the time between making a discovery and implementing it in a product.

The vice president of administration for **Alza Corp.** in Palo Alto, Calif.—a maker of special tablet coatings, skin patches and internal devices for administering drugs (known as drug delivery systems)—Fulscher likes to remind people that his is "a three 'S' company—small, smart and speedy." Those adjectives also characterize the necessary survival tools in the drug-delivery-systems industry, which **Alza** dominates through a strong patent position and an emphasis on speed and development.

This drive rules the company's development activities. "We are in a competitive business," said Director of Information Services Fred A. Knox. "To be competitive, we have to move quickly."

The company has paid specific attention to shortening the information float. "Once something is known, how long does it take until it's effectively utilized?" Fulscher asked.

Although the company has no concrete measure of that time, Fulscher estimates that **Alza** has seen a 10 to 20 percent improvement—the result of reducing redundant clerical work, sharing information, and communicating electronically, both internally and with suppliers. For a \$92.7 million company employing 650 people in 35 to 40 development projects at any given time, that adds up to a lot of money.

The key is emphasizing productivity through employment practices as well as through specific productivity tools, Fulscher said. "We spend a lot of time keeping this an informal and consensus-driven way to work. We've had flex time for 20 years or more."

Information technology plays a strong supporting role in making **Alza** more productive. It is used to eliminate duplicate data entry and data-synchronization problems. The company emphasizes data recycling. "I don't write letters anymore," Fulscher said; "I use old ones." Internally, he communicates via E-mail.

In the lab environment, **Alza** has 15 or 16 highly automated systems that allow technicians to process tens of thousands of blood and chemical sam-



FULSCHER (left) and KNOX: "We have to move quickly."

ples at a time and get clinical results more quickly. PCs enable researchers to do statistical analysis faster. Off-site technicians key clinical study data into laptops and download the information at night into Alza's central computer.

The company relies heavily on shared databases and clinical tools to give it the flexibility to change development directions in mid-stream. Researchers can redesign studies to incorporate unexpected effects before

the project has gone too far. Such flexibility is particularly important in developing products simultaneously. "We couldn't handle the number of simultaneous development [projects we have going on] without computers," Fulscher said. "We would not be competitive if we had to handle them sequentially."

To further enable speedy development, Alza has an online purchase-order system linked directly to its suppliers. One of the company's objec-

tives is to get 24-hour supplier acceptance of an order on 85 percent of its transactions.

For the future, Alza is planning a system that will let it file new products electronically with the Food and Drug Administration. The company is also looking at integrating manufacturing and development to reduce delay between the two phases, because, according to Fulscher, "how you deliver [is] every bit as important . . . as what you deliver."

—M. O'LEARY

wide parts information system: a single database of every part IBM owns, anywhere in the world.

At much smaller companies, speed allows an organization to maximize production and distribute as much product as possible. At **Ben & Jerry's Homemade Inc.**, the gourmet ice-cream maker in Waterbury, Vt., speed is essential to keeping the company's product on store shelves. Ben & Jerry's has trouble meeting demand because it doesn't have enough manufacturing space. Since the demand is so high, the company is unable to keep inventory and can only get its product to stores as quickly as it can produce it. Ben & Jerry's manages to maximize production and minimize time outlay by forecasting market demands by flavor and region, having very short production schedules, and carefully routing its deliveries for maximum efficiency.

The company supports the whole process with forecasting tools and custom software that manages inventory, order entry, traffic and truck routing. In this way, Ben & Jerry's can concentrate its full resources on getting products to retailers as soon as possible.

Ben & Jerry's enjoys phenomenal success in a crowded and mature market. But its push to respond quickly to its customers is more a result of its success (and a way to ensure its continuation) than a cause of it. The same is becoming true for companies in other industries. The days of long market lead times for brand new ideas are almost gone, even in high tech. Everyone has competition, and new businesses whose sole purpose it is to copy successful products spring up every day. As a result, companies are beginning to accelerate all phases of business in the hopes that a few minutes saved on the phone or at the copier will add up to an advantage in the marketplace. ☐

PHOTOGRAPH BY CINDY CHARLES

Because the data you need isn't always blue.



You've worked hard to create a powerful IBM® network. Now your users want the same kind of easy access to non-IBM data sources.

Legal needs access to LEXIS®. Engineering needs quality assurance data from an HP on the factory floor. R&D wants to work with a database supported on a public network.

What's the answer? More PCs and modems? More dial-out charges? More time consuming, awkward connection procedures?

LEGENT has a better way. STX™. A unique software solution that provides easy access to non-IBM data sources with a single keystroke from an ordinary 3270 terminal.

With STX, users simply select the sources they need from a menu screen. Sources such as DEC's All-In-1 or a Hewlett Packard database. Public networks like Telenet™, Tymnet™, CompuServe™ or Datapac™. Public databases such as Dow Jones News Retrieval™ or LEXIS/NEXIS®. And the list continues.

**STX,
for easy access to
non-IBM sources.**

STX automatically connects users to the information they need, without special hardware or awkward procedures. The result? Significant cost savings on hardware...and even more significant benefits in user productivity and satisfaction.

Access STX today and see what lies beyond the blue. Contact your local LEGENT account representative or call 800-323-2600 (412-323-2600 in Pennsylvania). Free 30-day trials are available for MVS and VM environments.

©1990 LEGENT
STX is a trademark of LEGENT.
IBM is a registered trademark of International Business Machines.
LEXIS and NEXIS are registered trademarks of Mead Data Central, Inc.
DEC and All-In-1 are trademarks of Digital Equipment Corporation.
HP is a trademark of Hewlett Packard.
Tymnet is a trademark of McDonnell Douglas Network Systems Company.
Telenet is a trademark of Telenet Communication Corporation (A U.S. Sprint Communications Company).
CompuServe is a trademark of CompuServe Inc.
Datapac is a trademark of Bell Canada.
Dow Jones News Retrieval is a trademark of Dow Jones and Company Inc.

LEGENT



SHARING INFORMATION (vi.) **1:** sharing information and ideas across departmental, professional and geographic boundaries; **2:** doing this in order to effect a global reach, cut costs, streamline management structures, and better design and market products; **3:** using information technology to that end

INTO THE BREACH

BY PAUL KONSTADT

AROUND THE globe, corporations are breaching geographic, political and organizational boundaries with ever faster and more efficient uses of information technology. As a result, they believe, their operations are more efficient and less costly to run, their products are better designed and manufactured, their marketing efforts are more effective, and their management structures are more streamlined.

"There are clever solutions out there if you realize the potential of IS," said Kurt Gladh, vice president of information systems and administrative development of Sweden's **AB Electrolux**, which controls, from its corporate headquarters in Stockholm, a worldwide manufacturing empire that grossed the equivalent of almost \$14 billion last year.

At some of this year's CIO-100 companies, once-important internal distinctions have shrunk almost to insignificance since executives began viewing their organizations from the outside in. "From our customers' point of view, we are all Xerox," said Patricia C. Barron, vice president of cor-

porate information management for **Xerox Corp.**, a corporate leader in the effort to make American industry more customer-focused. "Boundaries are always arbitrary, [and] there are many information interdependencies."

Xerox is in the midst of an information engineering program to make its major business processes independent of any given department. When the re-engineering is completed, the lessons learned from

organization that is now evolving allows for improved product quality and customer service, implementing the change has proven to be "painful" for Xerox, Barron said. "When they've been successful in an old way, it is often very hard to get people to think about moving to new ways; [to avoid change, they] can build very real functional foxholes." Time and training, she explained, are the antidotes to such behavior. "It is going to take a

.....

"A robust communications network is vital to our survival. We can capture the talent wherever it lies in the world, use whatever resources we need, and participate in global markets."

—Les Shroyer

.....

solving service problems, for example, could be transferred through the information system to manufacturing, research or any other department that would benefit from them. "Information technology is one of the few integrating functions of the company," Barron said. "We are driving to take a cross-functional, cross-organizational look at the structure of our business."

Even though the less-rigid

long time, [but expending that effort] will allow us to simplify the business."

Technological evolution is also helping to blur functional lines at Xerox. The company's new online remote copier-monitoring system collects data on copier performance at a central location and at the same time compiles individual machines' usage logs. This application aids in providing machine repair and maintenance



ILLUSTRATION BY MARK FISHER

while it keeps track of usage volume for billing purposes, thus uniting the customer-service and accounting functions.

While many CIO-100 companies are using information tools to simplify their organizations, others look to merge parallel structures quickly. This is the case with **The Valspar Corp.** of Minneapolis, one of the five largest paint and coating manufacturers in North America. Operating in a mature industry with little foreseeable growth potential, Valspar opted to expand by acquisition. Its gross revenue has grown from \$125 million in 1985 to \$625 million in 1989 due largely to its asset-buying policy, and the company's operating empire now includes five divisions running 24 manufacturing plants. "Our goal is to incorporate new entities as rapidly as possible," said Steven E. Clark, Valspar's director of MIS.

Newly acquired operations may have perfectly functional information systems and architectures, according to Clark, but unless the existing applications offer Valspar some new or unusual capability, they are abandoned in favor of the company's own proven systems, he said. For instance, when Valspar acquired Mobil Oil Corp.'s packaging division, it counted among its assets a system designed especially to manage the process of obtaining U.S. Food & Drug Administration regulatory approval for its products. Valspar kept that particular system, even as the bulk of the division's information technology was abandoned in favor of Valspar's existing structures.

The integration process generally takes substantial effort, Clark confided, whatever the state of the information systems. "Change is more difficult than we'd like to admit," he said. "It's never as easy as plugging it in."

Department store operators face unprecedented chal-

lenges in today's marketplace. Not only are the major chains saturating each others' territories, but specialty retailers like supermarkets and drug stores are poaching outside their traditional areas, offering shoppers toys, clothing, hardware and other items, in addition to their own mainstay products. The result is shrunken profit margins for all, as vendors scramble for ever-increasing efficiency and any possible cost-cutting edge.

Among the best scramblers and most efficient operators is CIO-100 member **Wal-Mart Stores Inc.** of Bentonville, Ark., which has thrived using information technology to break down barriers created by distance. The giant retailer's centralized computer system records sales, controls inventory and reorders stock, allowing senior executives to govern each of the 1,300-plus stores directly, while at the same time giving managers in the field autonomy from central administrative control to respond to local needs.

"IT lets us know what's selling and not selling, market by market and store by store," said Bob L. Martin, senior vice president of corporate information systems for Wal-Mart. "[We can] analyze sales performance and make decisions quickly," without vast layers of intermediate management.

Between 1980 and 1989, Wal-Mart cut its selling, general and administrative (SG&A) overhead from 20 percent of total revenues to 15 percent—a measure of the degree to which the old, conventional organization, with its many layers of managerial control, has been replaced by a simplified structure supplemented by advanced IT. (By contrast, Wal-Mart's chief rivals have cut their SG&A expenses little in recent years, and all now support heavier overhead burdens than Wal-Mart—K mart Corp.'s is 23

SNAPSHOT: AB SKF

Global Reach

By perfecting its ability to exchange information across all boundaries, this manufacturer has achieved true transnationality

As the world's largest maker of ball, roller and exotic bearings, AB SKF's 20 percent worldwide market share doubles that of its nearest rival. But without the assistance of globe-shrinking communications technology and boundary-bridging information architectures, SKF executives believe their

enterprise might have ground to a halt long ago; its sales forces isolated, its manufacturing paralyzed, and its customers disenfranchised. That's how much the innovative Swedish company's overall success has depended on its information systems.

"The philosophy when it comes to IS is [to be at the



leading] edge when it comes to communication and integration," said Håkan Landahl, SKF's director of group information systems. "[We have] to be coordinated to get the full power in each market."

SKF is the archetypal transnational corporation: Although it is headquartered in Göteborg, Sweden, its operations are dispersed around the world. The greater part of the company's assets are located outside Scandinavia, and its 45,000 employees staff 80 manufacturing plants scattered across 17 countries on five continents. Its sales force spans 130 countries, and 85 percent of its revenue is first counted in currency other than Swedish kronor.

The vast bulk of SKF's 1989 revenue—\$3.3 billion of \$4.1 billion—was derived from its core "anti-friction" business. Most of the rest came from the sale of precision components whose manufacturing and design processes are similar to those for bearings, and from the sale of specialized grinding and milling machine tools. The company's 20,000 different types of bearings and components are used in industrial machinery, motor vehicles, aircraft and power generation equipment, while its machine tools and systems are sold to other bearing manufacturers.

Information systems are integrated into all phases of SKF's operations. Computer-aided design and simulation equipment guides the engineers who create and perfect new products. Computer-integrated manufacturing sys-

tems turn out the goods. "We have based all the major items"—forecasting, planning and scheduling, manufacturing support, and both international and domestic customer service—"in one chain with common systems, [and] tied it together with a global network," Landahl said.

That same worldwide network links the sales staff to the factories, so that any salesperson located anywhere in the world can have up-to-the-minute data on product specifications, availability and pricing. "When [a customer] asks for a bearing, [the salesperson] will find support from systems all the way back [and] always get the global availability, not [just] the local availability [of the product]," Landahl said. "In this way, we use our worldwide IS to add product value for our customers."

Each of SKF's manufacturing centers is focused on a single product or closely related family of products, and most products are made at only one location. But thanks to SKF's pervasive networking, knowledge about manufacturing, marketing or managerial functions that has been gained in any one area is routinely shared with operations in others. This provides SKF with the benefits of synergy among its operations without them having to be in physical proximity to one another. "We can provide competence throughout the organization [that has been] gained in earlier experience," Landahl said. "All our data centers are connected together."

—P. KONSTADT

LANDAHL: *We have to coordinate to get the full power in each market.*

percent, The May Department Stores Co.'s is 19 percent, and Dayton Hudson Corp.'s is 17 percent.) In coming years, Martin predicted, competitive pressure will force continued compression, making the jobs of individual managers even more complex, giving them more varied responsibilities than they have now.

"As the business becomes faster, we will have to operate on thinner margins," Martin said. "You just can't make mistakes in this kind of environment, and the technology has to continue to shield us from [those] complexities."

Information tools also help multinational manufacturers to bridge the intercontinental distances that separate some of their operations, allowing firms like **Motorola Inc.**, of Schaumburg, Ill., to seek out the cheapest labor or best access to raw materials for any part of its manufacturing process without hampering other operations. "We are probably a world-class organization in terms of network connectivity," said Les Shroyer, Motorola's director of MIS and telecommunications. His world-spanning network comprises "24 IBM 3090-class mainframes; perhaps 500 to 600 larger minicomputers; and 30,000-plus Apples, IBMs and clones; and Unix workstations."

Motorola uses that mass of information-processing power to manage a manufacturing process that might start in Texas with chip fabrication, progress to Malaysia for circuit assembly, then end up in Europe for final testing. The same system is harnessed to produce pocket pagers so quickly, Shroyer added, that the interval between the time a pager is ordered and the time it is manufactured can be measured in minutes.

"A robust communications network is vital to our survival," Shroyer said. "[We] can capture the talent wherever it

lies in the world, use whatever resources we need from their best sources, and participate in global markets."

Another type of boundary to be bridged by information technology is the one separating vendors and suppliers. Vast networks now orchestrate the most sophisticated large-scale manufacturing efforts, coordinating the processes themselves and synchronizing them with the efforts of component and subsystem suppliers—telling those firms how much of what item to make, and when it must be delivered. In manufacturing parlance, the descriptive phrase is just in time (JIT). Japanese automakers pioneered JIT and progressive European and American competitors like **Ford Motor Co.** of Dearborn, Mich., and **Fiat SPA** of Turin, Italy, have embraced it. Fiat uses its network to follow the progress of orders for raw materials and components and to adjust its manufacturing schedules as appropriate. It also feeds the same data to its retail network, so that the dealers can follow an order all the way from production to market, just as if they were a division of Fiat.

In the mass-market arena, too, vendors and manufacturers who once jealously guarded their corporate privacy are now sharing information at a prodigious rate in order to speed up the transition from raw material to final sale and reduce the volume of goods sitting idle in the distribution pipeline. **Kimberly-Clark Corp.**, of Dallas, uses its systems to link directly to checkout-counter scanners and super-market inventory controllers. These electronic links help KC know more quickly what's selling and what's not, enabling it to adjust production and marketing efforts. At the same time, KC and its outlets can use the system to be assured that hot-selling products are always available for consumers at minimum cost. 



If you're struggling with document management, reinforcements are on the way.

Enlisting Minolta's full line of imaging systems will help your business transform document management from a burden into a resource.

From Minolta's world-renowned microfilm technology to digital imaging, our full line allows you to store and retrieve information faster than you ever thought possible. And increasing the power and speed of your document management boosts the efficiency and profitability of your office.

It's a complete lineup that'll help you win the battle against obsolete paper-based document management.

As always, you'll have the knowledge and experience of Minolta's professionals to recommend and implement the system that'll best suit the needs of your business. So contact Minolta at 1-800-821-7700, ext. 327. And join our document management revolution.





KNOWING THE MARKET (*vi.*) **1:** being able to pinpoint and meet the needs of existing and potential customers; **2:** using this information to increase market share or create new markets

MINING DATABASES TO DIG UP BUSINESS

BY PAUL KONSTADT

THREE EXECUTIVES were debating which language was best-suited for international business.

"English," said one, "since the United States is the single most important presence in world markets."

"French," argued another, "because each word is so rigidly defined there can be virtually no ambiguity."

"My customer's," said the third simply.

As the phrase "customer-driven" has risen to the status of business watchword, knowing how to identify, attract and satisfy potential buyers of a product or service has become a fundamental challenge for many endeavors.

Some CIO-100 innovators have gained an edge by collecting and analyzing data from their operations at an unprecedented level of detail. Others have found new ways to use what information they already possessed to identify customers' needs and target marketing efforts to meet them. Still others have com-

pressed their manufacturing processes so that they can quickly respond to customer demand, not merely try to anticipate it. Despite the variety of these approaches, they all have a common thread: None would have been viable without the creative use of information tools.

ulatory protection of their home markets, and non-bank organizations are now marketing bank-type services (Sears and AT&T push credit cards, and some mutual funds offer checking-account equivalents). As a result, organizations like Banc One have been forced to search for novel

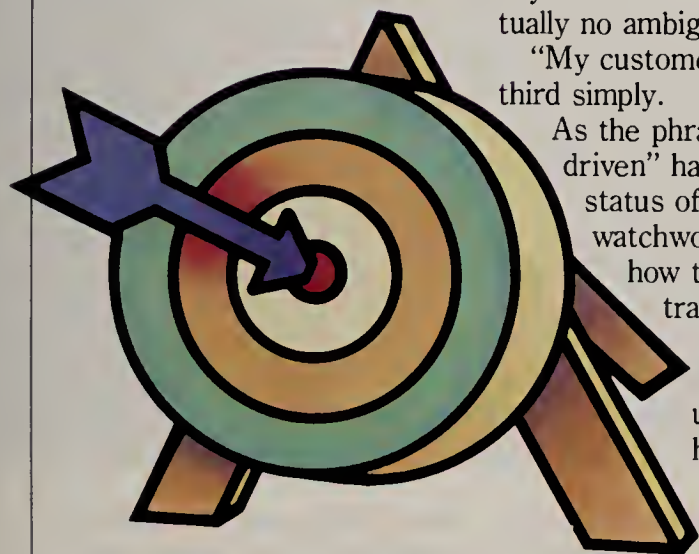
Organizations like Banc One have been forced to search for novel ways to wring extra profit mileage out of existing assets—such as their vast customer-information files.

At **Banc One Corp.**, a bank holding company with operations spread across the Midwest and based in Columbus, Ohio, "technology is available literally to everybody," said David Van Lear, president and CEO of Banc One Services Corp., the firm's information technology arm. "It is the focusing of that technology on business objectives that is the principal role of the technology group."

Bank holding companies are facing intensified competitive pressure on two fronts: Individual banks have lost the reg-

ways to wring extra profit mileage out of existing assets—such as their vast customer-information files.

Banc One is heavily committed to the marketing technique known as relationship banking (see "Money Isn't Everything," *CIO*, April 1988). At Banc One, information on a given customer's various accounts, loans and mortgages is contained in a central file. That data is available to all departments of the bank that need it, and it is correlated with relevant demographic and market-research facts. This



enables the bank to use its list of mortgage customers to prospect for sales of home-equity loans, for example, or to fix virtually any customer problem with a single telephone call. "If you do not treat your customers based on your total relationship," said Van Lear, "you're going to lose them."

This database also enables the company to market other organizations' insurance and investment products, and in the future—if existing banking regulations are loosened—it will help Banc One to more

.....

USAA's systems allow complete servicing of any account from field offices across the country and in Europe as readily as from company headquarters in San Antonio, Texas.

.....

easily produce and sell its own financial products.

While Banc One is taking aim at what for banks are non-traditional financial services, insurance companies like the **United Services Automobile Association (USAA)** are using the same techniques to fire their own competitive volleys in return—using huge files of insurance policy buyers to find potential customers for credit and transaction accounts. Consider, said USAA Vice President George McCall, a single event like the purchase of a new car. USAA, which began its life as an automobile insurance company for members of the armed forces, provides the auto insurance. "Then we can let that one

event trigger a whole series of things we can do . . . automobile financing, property and casualty insurance, mechanical breakdown insurance; what we have built is an automated customer-service environment. Our systems serve as a tremendous integration tool," allowing the banking, insurance, and financial-services arms of USAA to "appear as a single company."

To achieve that unity, USAA has created a centralized database with both images and conventional data files, and it has hooked that system to an intercontinental data communications network. These tools allow complete servicing of any account from field offices across the country and in Europe as readily as from the telephone answering facilities of company headquarters in San Antonio, Texas. "Without information technology, it would not be possible to service our members from afar," McCall said.

The crusade to service customers more effectively is growing throughout the insurance industry, and USAA's competitors are finding other ways to use information technology to build on their relationships with policyholders. "Clearly customer service is what it's all about," said Rex Wolf, former senior vice president of IS at **The Progressive Corp.**, a multiline insurance company based in Cleveland. (Wolf left Progressive in May; as of press time he had not been replaced.) "Part of our business strategy is to differentiate ourselves through superior service, so whatever we can do with IT is a top priority."

Unlike USAA, which handles its customers directly, Progressive, like most other insurers, deals with policyholders largely through agents. To establish the same kind of complete and up-to-the-minute database on its customers, Progressive established an EDI system that

SNAPSHOT: The Procter & Gamble Co

Rising Above The Clutter

P&G has teamed IS and market research to help consumers distinguish between its products and the thousands of others lining supermarket shelves

Robert J. Herbold's mission is to build an information system that will find the keys to what marketers refer to as The Prison—the miles of product-packed aisles that fill the nation's supermarkets. Herbold is senior vice president of The Procter & Gamble Co. of Cincinnati. His massive market-research machine knows what motivates consumers so well that it can use package design, merchandising promotions and advertising to guide a shopper's hands to select P&G products out of the jumble almost as surely as if a company agent had held the shopper's wrists. The effort requires the most minute analysis of vast mountains of data using the most advanced information tools; an interdepen-

dence underscored by the fact that Herbold is simultaneously P&G's top market-research executive and its CIO.

"We do more market research than anyone else in the world," Herbold said. "The goal is market leadership, [so] it's important that we understand [each] category from the standpoint of what it takes to move volume."

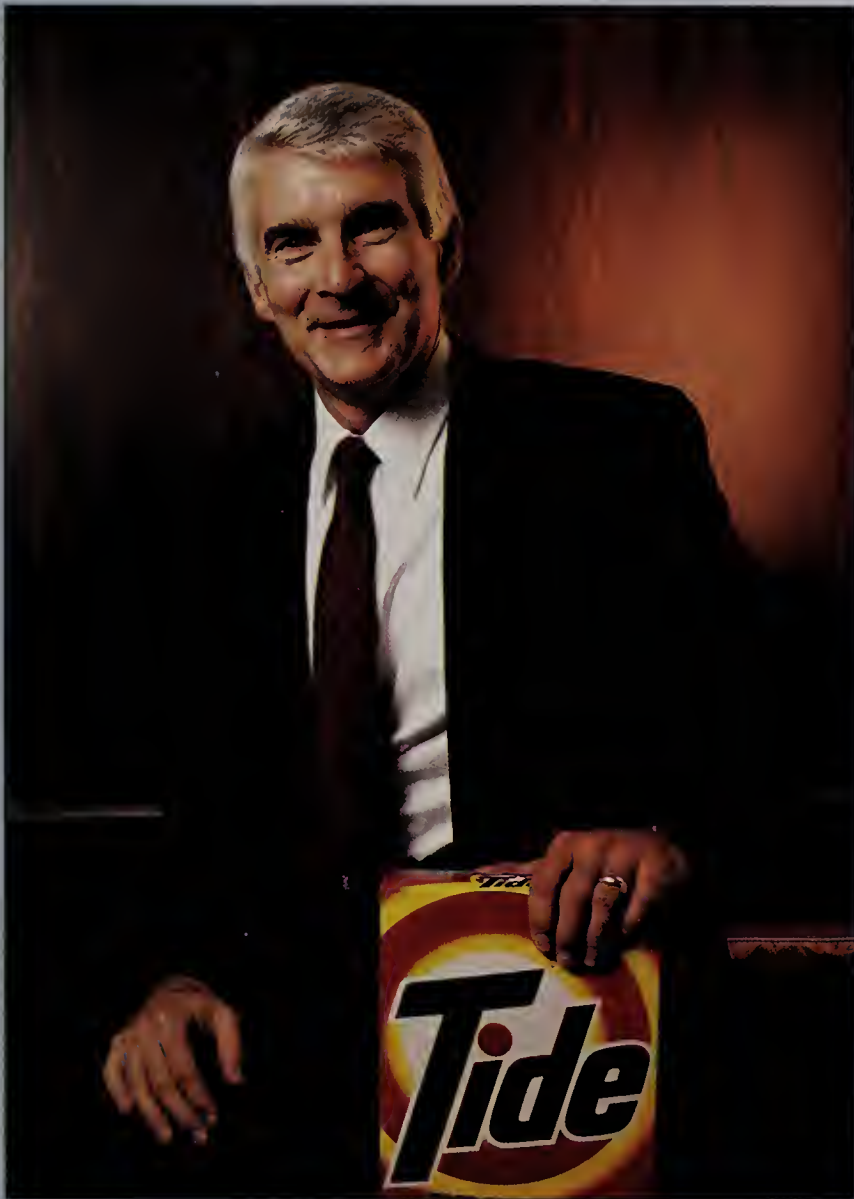
Gaining that understanding is a costly enterprise for P&G. The company has built a network of over 1,000 top-of-the-line IBM PS/2s, each of which uses a custom-designed analysis application to search for the golden nuggets of information buried in the bowels of a massive Teradata-computer-maintained relational database. "In this business, analysis is very important," Herbold

provides a two-way data flow between agents and the Progressive host system for underwriting, claims processing and billing. "It's changing the way we're doing things, absolutely," Wolf said.

Not only has this network sped up the basic policy-administration processes and made them more efficient, it has also allowed Progressive in some cases to dispatch ad-

justors equipped with laptop computers to the scene of major losses "rather than waiting for the insured to call us," said Wolf. Being able to gather information on the incident independently, he explained, improves service and "helps to minimize exposure [and] fraud."

Better information about customers and their needs has also changed the way manu-



HERBOLD: "We have to know what consumers are interested in."

said. "Small things can mean a lot, [so] It is worth analyzing them carefully. . . . We have to know what consumers are interested in."

P&G does use traditional sources of data—such as almost ceaseless market-research polling—to help feed the insatiable

maw of its mainframe database. But Herbold pointed out that technology has given him a far richer source: the records of supermarket checkout-line scanners, electronically kept shopping diaries, and television audience measuring devices, all of which give

him the ability to monitor the behavior of large numbers of consumers during their normal day-to-day activities. "The thing that broke it wide open was the onslaught of scanner data. . . . When we get down to the store level . . . as well as track individual households, then we can get a lot more robust information. . . . It's a powerful engine to drive the analysis we have been talking about."

P&G's largest marketing expense is its advertising; historically, the company has been the biggest buyer of television time in the United States. Existing audience-measurement technologies may give the clearest image to date of television watching behavior, but Herbold is hoping for even more refined data in the future. "Today suppliers can track whether [a given household's] TV is on and what station it has on. What we would love to be able to do is to know who's in front of the TV: the kid, the dog, the person who typically does the shopping, or the person who forms the opinion that is dominant in that particular category." Such an ability, Herbold believes, would give him virtually complete knowledge of the entire sales process.

—P. KONSTADT

facturers are doing things. At Cambridge, Mass., shoemaker **Stride Rite Corp.**, for instance, electronically exchanging sales, ordering and production data between manufacturing and retail operations allows for production and shipment within 24 hours of order receipt. "Shoes are such a trendy business," said John Piasecki, vice president of MIS at Stride Rite. "Al-

though there's a lot of brand loyalty, there's also a lot more competition."

Stride Rite's EDI tells much more than simply how much of what product line is needed at which retail outlet; it reports back daily on what specific colors, styles and sizes are most in demand. This information is "important for staying on top of the market," Piasecki said. "It's im-

portant to the sales force to know what's hot."

Ben & Jerry's Homemade Inc., the premium ice-cream maker based in Waterbury, Vt., may worry more about cold than heat, but its production-planning process is very similar to Stride Rite's. Because of product perishability and prohibitive storage expense, virtually all of Ben & Jerry's ice cream is manufac-

tured to order. "As soon as distributors call in, we start the order processing," said Keith E. Williams, director of information services. "From call to unloading takes less than a week." Supporting the effort is a system the company developed for itself (off-the-shelf materials-resource-planning software was too slow and too restrictive, Williams said) that uses historical demand data to project upcoming orders by region and by flavor.

Taking a different tack entirely on knowing its custom-

.
"As soon as distributors call in, we start the order processing. From call to unloading takes less than a week."

—Keith E. Williams

.
 ers is **S-K-I Ltd.**, of Killington, Vt., which owns and operates three resorts (Mt. Snow and Killington in Vermont and Bear Mountain in California) and manages a fourth (Vermont's Pico Peak). Not content merely to speed up basic processes like check-in, ticketing and billing (see "Customer Service," Page 79), S-K-I is also using its systems to accumulate and interpret consumer behavioral data to the smallest detail. From the moment skiers contact a S-K-I reservations agent to the time they check out of their resort, the company's information systems are collecting data on virtually everything they do. This data is used to make the company's operations more efficient. Said Ivars "Ike" Eichvalds, S-K-I's manager of MIS, "You have to set standards to squeeze out the few more profits." ☐

PHOTOGRAPH BY ANDY SNOW

XEROX



It takes 120,000 pounds of thrust to get it aloft, and only 5 pounds of paper to ground it.

The ever-reliable Federal Express grounded? By a mere five-pound manual?

It will never happen. Thanks in part to a document processing system developed jointly by Federal Express and Xerox.

You see, Federal Express' vast fleet of planes has to be checked before every flight—following strict FAA regulations. A process that requires thousands of complicated manuals. And every time there's the smallest change in regulations, Federal Express has to update every one of those manuals.

To help get this kind of information to Federal Express' 70,000 employees

faster, Xerox put together an innovative network of scanners, workstations and laser printers. Now the vital manuals are printed over 70% faster. And 96.2% cheaper.

What's more, planes aren't the only thing Xerox helps Federal Express move. With this system, graphics, text and data flow between multiple authors, and between Federal Express' existing PC's, Wangs and DEC's—with unbelievable flexibility.

So if you have a document processing problem you'd like Xerox to help you solve, call 1-800-TEAM-XRX, Ext. 122A. Or send in the coupon.

And let Xerox help you make sure

that problems like this never keep your business from taking off.

Yes, I'd like to learn more about Xerox and how they can help solve my document processing problems.

- ☐ Please send me information.
☐ Please have a sales representative contact me.

Send this coupon to:
Xerox Corporation, P.O. Box 24,
Rochester, NY 14692



NAME Please Print TITLE

COMPANY PHONE

ADDRESS

CITY 999-8-90 STATE ZIP

XEROX
The Document Company



CUSTOMER SERVICE (*n.*) **1:** delivering the products and services that customers want in the way that they want them; **2 a:** having knowledge of customer needs and desires; **b:** the ability to meet those needs and desires

THE GOLDEN RULE

BY DEBORAH COOPER

IN MOST BUSINESSES these days, companies that don't offer money-back, no-questions-asked guarantees or personally answer customer complaints are becoming the exception rather than the rule. And while retailers might have been first to jump on the customer-service bandwagon, this year's CIO-100 indicates that most companies are increasingly customer-focused. In fact, 35 of our U.S. and European innovators indicated that delivering the products and services customers want, in the way that they want them, is in some cases the company's most important strategy for staying ahead of competitors. And the results of our Japanese investigations (see Page 91) indicated that in the land of the rising sun, innovation in business is increasingly driven by the need to serve customers well.

While service with a smile is still fundamental to developing a sound relationship with customers, today's organizations employ a wide range of technology tools and IS strategies in their quest to know and serve existing customers better and to create binding ties with new ones. Relational

databases, laptop computers and EDI support marketing, sales and distribution and change the way companies see their customers. Companies are increasingly intent on discovering customer preferences and providing a forum for consumers to voice their complaints and suggestions. Also important are getting products to customers more quickly, cutting back on store returns, and gauging the effectiveness of promotions and other plays. Has the corporate world suddenly developed a streak of altruism for its own sake? Not at all; customer service returns value to the enterprise in numerous ways.

Wal-Mart Stores Inc., headquartered in Bentonville, Ark., uses about every available IT approach to "satisfy our customers and yield a better level of service," according to Bob L. Martin, senior vice president of corporate information systems. "Customers may spend 30 minutes shopping in your store, but if you keep them waiting in the check-out line, that's what they're going to remember." Wal-Mart's in-store IT equipment includes basic scanning technology at the registers, electronic bank-card authorization and electronic check approval. On the corporate level, Wal-Mart extensively uses EDI and satellite sys-

tems for two-way data, video and voice communications.

Industries that jaded consumers thought could never offer good service are surprising them today. **British Airways PLC's** IS department works closely with marketing to know more about its passengers. The large, comprehensive relational database the Hounslow, England-based airline is now developing will not only help find lost luggage faster; it will retain files on passenger preferences for seat locations and special meals. Reservation operators can readily access this information so passengers don't have to make the same requests each time they make travel plans. "If you know more about a passenger," said BA's John Watson, director of information management, "you can concentrate on providing special services to that passenger."

Back on the ground—but still at a lofty elevation—**S-K-I Ltd.** of Killington, Vt., is striving to meet customers' needs before the customer is even aware they exist. S-K-I, which owns three resorts and manages a fourth, uses sensors to measure the lengths of lift lines; this data helps operators plan trail maintenance, adjust lift capacity, and deploy personnel. A database of staff skills adds another dimension



to S-K-I's efficient deployment of personnel. By identifying cross skills, the resort can shift staff from one area to another, depending on where demand is greatest at any given time throughout the day. For example, a lift worker might also be able to run the cash register in the ski shop. The end result of all this data-gathering is to give skiers less time standing on lines and more time schussing down slopes.

Sometimes giving employees the power to solve customer problems changes a company's focus from a merchandising to a customer-service orientation; this was the case with **L.L. Bean Inc.**, in Freeport, Maine. The company always depended on feedback from employees to maintain customer satisfaction. Then, in 1988, with over 8 million orders generated annually, it found 14 percent of its goods being returned by dissatisfied customers. Employees realized that 65 percent of the returns involved wrong sizes and recommended updating the size information in catalogs and the company's database. "By making all our information about customers and products available to our employees, with the necessary tools to access them, they can make more-informed business judgments on their own," explained Horace Gower, vice president of information services.

At **Hewlett-Packard Co.** in Palo Alto, Calif., a significant investment has been made in a customer response center, through which all customer-service inquiries are funneled. Center staff members are equipped to offer customers online diagnostic services. If a customer's problem can't be answered either over the phone or online, a field-service engineer armed with database information on the customer's service history, equipment and scheduled upgrades is dispatched to the

customer's site. This lets them take the right tools and parts with them on the first—and hopefully the only—service call.

Xerox Corp., in Stamford, Conn., developed a remote-diagnostic program that allows preventive maintenance to be scheduled at a customer's convenience rather than waiting for a surprise system crash. According to Vice President of Corporate Information Management Patricia C. Barron, not only was this system well-received by cus-

tomers, but it also differentiated Xerox from other companies manufacturing similar high-end products.

Two years ago, the IS department at ice-cream maker **Ben & Jerry's Homemade Inc.** in Waterbury, Vt., was practically nonexistent. Now it seems to be making up for lost time in applying technologies that help customers. Using Macintoshes running WordPerfect, it custom-answers letters in one day rather than the two to three weeks it used to take. It also

has written software that allows scoop-shop and super-market orders to be filled and dispatched in less than a week. And it can track customer complaints about ice-cream flavors or contents back to a specific plant or crew so it can change recipes rapidly. If customers in the Baltimore area complain that there are not enough cherries in Cherry Garcia, more can be quickly added.

Many of *CIO's* innovative companies singled out EDI as the most important technol-

SNAPSHOT: Stew Leonard's

Bread and Circuses

Behind the carnival atmosphere at this Connecticut dairy store is a keen eye for detail and an aisle's worth of technology

The customer comes first, last and always at Stew Leonard's, the self-proclaimed "world's largest dairy store," located in Norwalk, Conn. Not only do kids get a barnyard full of live animals and seniors free bus service to the store, but everyone gets products that are fresher and of better quality—and often lower in price—than what they find in other supermarkets, according to store management.

Although their business might seem more playland than boardroom, Leonard and his family have serious reasons for every action they take. Most, in fact, involve "creating happy customers" in one way or another. Every week more than 100,000 of those customers shop

in the 37,000-square-foot store. Even with a single location, total revenues in 1989 topped \$108 million.

Removing all the layers of hoke from the face Stew Leonard's presents to its customers uncovers a fairly sophisticated IT system. "We're very high-tech around here and true believers in what the computer can do to help us do our job better," said Stew Leonard Jr., eldest son of the store's founder and president of the operation. Leonard calculates that the IS budget last year was over \$500,000. Additionally, he said, Stew Leonard's has over \$1 million invested in its mainframe and \$500,000 in its PCs and peripherals.

Computers are used in every facet of the busi-

ness, but most significantly in sales and marketing, according to Leonard. The company has built a database that includes demographic sketches of customers broken down by zip code. This information is then used for direct-mail advertising, and in inventory control and ordering.

What Stew Leonard's does to satisfy customers could fill a Harvard Business School case study, if not a book. In *A Passion for Excellence*, Tom Peters devotes a chapter to Stew Leonard's, which he calls one of the best-run companies in America.

Some initiatives to make customers feel like part of the family are simplicity itself: friendly employees, free ice-cream cones for customers who spend more than \$100 on an order, and store walls that display photos of celebrity shoppers as well as customers holding Stew Leonard's shopping bags in front of the Kremlin, the Great Wall of China and the Pyramids.

Other initiatives rely on technologies that might not be leading-edge but

STEW LEONARD SR. and JR.: costumes and computers

ogy for supporting customer service. With EDI encompassing many parts of an organization—from research to manufacturing to accounting—it is certain to make everyone “listen” more closely to customer demands. And with increasing numbers of foreign customers, EDI allows companies to get and stay in touch with these remote customers more efficiently. For example, **Cargill Inc.**, the agricultural products company headquartered in Minnetonka, Minn., uses EDI to provide such precise

information as the exact time a shipment of grain or beef will arrive and the railway track it will arrive on.

Although sophisticated information technologies can play a large role in serving and supporting the customer better, this is one area where the use of IT is not always essential. In fact, some companies have done an excellent job of serving their customers with some pretty low-tech approaches. For example, Norwalk, Conn.-based **Stew Leonard's** makes it a policy to

respond to submissions to its shopper suggestion boxes on a daily basis. Wal-Mart has a greeter for senior citizens at the front doors of its stores, and Ohio's **Banc One Corp.** has extended banking hours to Sunday. **The Body Shop Inc.**, the Cedar Knolls, N.J.-based subsidiary of The Body Shop Ltd., is a skin- and hair-care products company known for its attention to customer service. The Body Shop believes that while some technology is essential to running its business, too much can interfere

with the “personal touch” the company prides itself on.

Of course, all this lavish attention to customers could backfire. The large customer-preference databases organizations are now compiling could raise the issue of invasion of privacy if not handled correctly. But as products lose their distinctiveness and foreign competition becomes stiffer, differentiation has to come from someplace. ☐

Deborah Cooper is a freelance writer based in Boston.

are certainly advanced for a company whose senior executive has been known to put on a cow costume to entertain the children of shopping parents.

“We have actually put some interactive videos in the store for customers to use, and they have been

very successful,” said the younger Leonard. “We’ve done things like ask shoppers what kind of recipes they’d like. They select from several choices and get a printout they can take home.”

In addition, Stew Leonard's has linked the data

from its 40 cash-register bar-code scanners to an NCR mainframe. In this way, management can tell within an hour if an item is not moving. “We use IT to generate information about the one million items that we sell here every week. The computer is

constantly comparing sales [of a particular item] to prior sales . . . so that we can eliminate an item from our inventory or reposition it in some way if it's not selling,” Leonard said. This positioning is especially necessary for Stew Leonard's; unlike the average supermarket that carries 15,000 different items, Stew Leonard's stocks only 700.

The store also takes the ideas placed by customers in the front-of-the-store suggestion box and inputs them into a database. “We are able to network answers to common customer questions on the computer,” Leonard explained. “We have a policy to answer every question within 24 hours, and the computer allows us to do this.”

Even with Leonard talking about “pushing technology to the front line,” one can't forget the sight of the three-ton granite tablet at the store's entrance. Like some early biblical or prehistoric message, it reads: “Rule 1: The customer is always right. Rule 2: If the customer is ever wrong, re-read Rule 1.”

—D. COOPER



SPECIAL
Broadcast Quality
Edition for
CIO Subscribers

The 1990 Conference

For Information Executives and Senior Management

**You are invited to hear America's information leaders
present and discuss their top business priorities.**

CONFERENCE PROCEEDINGS ON AUDIO CASSETTE

Full Album of 8 Cassettes Includes:

CASSETTE 1

"PROGRAM WELCOME & INTRODUCTION"

- Joseph L. Levy, Publisher, CIO Magazine/Tony Whyte, President AMR

"INFORMATION STRATEGIES and THE BOTTOM LINE"

- Jack Simpson, President, Mead Data Central

"THE ROLE OF TELECOMMUNICATIONS IN GLOBAL COMPETITION"

- William McGowan, Chairman & Founder, MCI Communications

CASSETTE 2

CIO Panel Discussion: "TOP PRIORITIES OF CIOs TODAY"

- Chairman, Raymond J. Lane, Sr. Vice President & Officer in Charge Information Systems Group, Booz, Allen & Hamilton
- Charles Darnell, Executive Vice President, Lithonia Lighting
- Jack Hancock, CIO, Pacific Bell
- Chuck McCaig, CIO, Mutual Benefit Life
- John Nagata, Assistant Superintendent Information Technology, Los Angeles Unified School District
- Joe Nash, CIO, Cadbury Schweppes
- DuWayne Peterson, Executive Vice President, Merrill Lynch
- Henry Pfendt, Director Information Technology Systems, Eastman Kodak

CASSETTE 3

"THE IMPACT OF TECHNOLOGY ON PEOPLE"

- Mitchell Fromstein, Chairman & CEO, Manpower, Inc.

CASSETTE 4

"HOW FAST IS TECHNOLOGY MOVING FORWARD?"

- Andrew Grove, Ph.D., Chairman & CEO Intel

CASSETTE 5

"STRATEGIC ALLIANCES FOR BUSINESS DEVELOPMENT"

- Henry Pfendt, Director Information Technology Systems, Eastman Kodak

CASSETTE 6 CEO/CIO Partnership Panel Discussion:

"ACHIEVING SUSTAINABLE COMPETITIVE ADVANTAGE THROUGH INFORMATION TECHNOLOGY"

- Chairman, Raymond J. Lane, Sr. Vice President & Officer in Charge Information Systems Group, Booz, Allen & Hamilton.
- Carl Amdahl, Chairman & Co-Founder, NetFrame Systems
- Charles Darnell, Executive Vice President, Lithonia Lighting
- Clay Cipione, Vice President Systems & Technology, Mead Data Central
- Glenn Miller, Vice President Corporate Strategy, Businessland
- Morris Taradalsky, V.P. Customer Services & Info. Technology, Apple Computer, Inc.

"INFORMATION MANAGEMENT AT APPLE COMPUTER"

- Morris Taradalsky, V.P. Customer Services & Info. Technology, Apple Computer, Inc.

CASSETTE 7

"THE YEAR AHEAD FOR THE ECONOMY, FOR BUSINESS"

- Malcolm S. Forbes, Jr., President, Forbes Magazine

"THE ROI OF SYSTEMS INTEGRATION"

- Charles Feld, Vice President Information Systems, Frito-Lay

CASSETTE 8

"MANAGING POLITICAL ACTIVITIES IN REAL TIME"

- Robert Teeter, Republican Pollster and Head Bush Transition Team

"KEEPING THE BIG 'IS' PROJECT ON SCHEDULE AND ON BUDGET"

- Chairman, Marcia Blumenthal, Editor, CIO Magazine
- Robert Dever, CIO, Liberty Travel
- Charles Feld, Vice President Information Systems, Frito-Lay
- DuWayne Peterson, Executive Vice President, Merrill Lynch

The full 8 Cassette Program in a handsome library binder is:

- ☐ CIO Subscriber Price \$145
- ☐ Regular Price \$195

Three easy ways to order:

You may register by FAX (508) 872-0618 or (203) 661-8472

You may call Toll Free

PLEASE CALL (800) 343-4935. Ask for Lori Cardarelli or Diane Martin

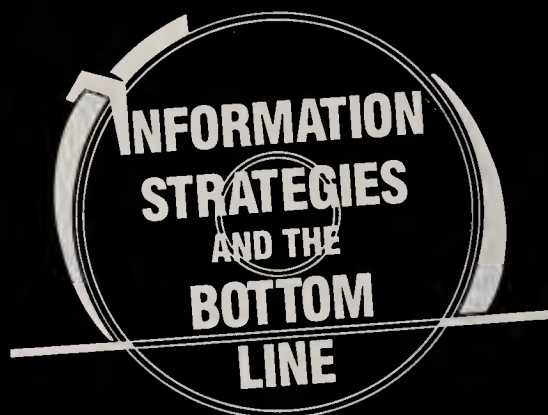
You may return this form by mail

To: CIO MAGAZINE • 492 Old Conn. Path, Framingham, MA 01701

CIO Magazine and AMR International
are proud to present:

The 1990 Conference

For Information Executives and Senior Management



Sunday, February 4 - Tuesday, February 6, 1990
at

The Ritz-Carlton Hotel
Laguna Niguel, California

Hosted By

Apple Computer, Inc. BOOZ-ALLEN & HAMILTON BUSINESSLAND
COMPUTER ASSOCIATES COMSHARE MeadDataCentral NORTHERN TELECOM UNISYS

Call Toll Free (800) 343-4935

Mail to: Registrar CIO/AMR Conferences c/o CIO Magazine
P.O. Box 9208, Framingham, MA 01701-9900

☐ Yes, please send me the full set of conference materials on audio cassettes.

☐ I am a CIO subscriber ☐ Please start my subscription

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE () _____ SIGNATURE _____

Make check payable to: CIO/AMR Conference (\$145 CIO Subscriber/\$195 Reg.)

☐ Check enclosed ☐ Bill Co. Bill my credit card: ☐ AMEX ☐ MC ☐ VISA
☐ \$145 ☐ \$195

Account No. _____ Expires: _____



QUALITY (*n.*) **1:** a constant focus on excellence throughout the organization; **2:** a companywide grasp of what customers demand of a basic product or service; **3:** the ability to create goods that require meeting exacting tolerances

THE UNENDING QUEST FOR QUALITY

BY PAUL KONSTADT



ILLUSTRATION BY MARK FISHER

A CROSS THE American business landscape, the pursuit of quality is, in and of itself, often an innovation. Almost every company looks for ways to make its product or provide its service faster, cheaper or both; but only a handful of firms have committed themselves to the economic *perestroika* that is the "total quality" revolution—creating an organization that is geared toward identifying customer needs, then focusing all of its efforts toward meeting those needs to the customer's satisfaction.

Quality improvement rhetoric is directed first at changing employee attitudes and behavior. But executives acknowledge that information technology is a critical enabler for the effort, with sophisticated communications and computational tools and data storage systems serving as keys to quality successes.

This is a common theme among manufacturers, whose computer-guided production equipment and advanced testing and process-control systems are becoming ubiqui-

tous. But among the manufacturing quality leaders of the CIO-100, those systems are also tightly integrated—with data from engineering, production and field service all used to improve product design and manufacturing techniques. "Virtually everything we do in quality comes to us through the MIS system; we would be blind without it," said T.J. Rodgers, president and chief executive officer of **Cypress Semiconductor Corp.** in San Jose, Calif. "What you don't track, you don't manage."

This appreciation for IT was echoed by service providers, who have long used computers to handle specific functions like accounting, but who are now pushing beyond automating administrative tasks. "I like to believe that our group is directly responsible for the outcomes of patient care," said Jeffery Tarte, vice president of information services at the **New England Medical Center** in Boston. "Without access to information, clinicians have a difficult time performing professionally with patients."

In the lexicon of quality, the most fundamental benchmark

is customer satisfaction: The happier the customers, the higher the level of quality. But supporting the satisfaction measures is product or service perfection, and quality innovators among this year's CIO-100 are reaching to do their jobs with once-unimaginable levels of precision.

Two good examples from the manufacturing sector are **Motorola Inc.** and **Westinghouse Electric Corp./Commercial Nuclear Fuel Division** (CNFD)—both winners of the prestigious Malcolm Baldrige National Quality Award and both creators of integrated information systems with unusual customized features that help them succeed in the race for manufacturing perfection.

Motorola, based in Schaumburg, Ill., currently mass-produces electronic devices and semiconductors so well that just a small pile out of every million has any kind of flaw. The company is striving to perfect the manufacturing process to reduce that number to only a fractional percentage in two years. It is a goal that requires intensive use of information technology to track every step of the

manufacturing process: recording and assembling statistics that will reveal what works and what doesn't, according to Richard Buetow, the company's corporate vice president and director of quality. "The only way [to] do that is to know worldwide where we are falling behind [and] where we are doing something outstanding, so we can spread that knowledge everywhere . . .," he said. "You can't run a \$10 billion company with paper and quill pens. Without computers, we would be totally incapable of tracking the data."

Motorola has marshalled substantial information-processing horsepower for that task: two dozen large mainframes, 600 minicomputers and 30,000 desktop machines worldwide—the bulk of which are networked together. But according to Buetow, creating a single, standardized form for the data was the major priority of the quality effort. "Whether [employees] speak Chinese, Japanese, Hebrew or Danish, we just have a common system in which all the data is the same. Boy, can you move a corporation when you have a common [data] language around the world."

Information technology is also important for the Pittsburgh-based Westinghouse CNFD, where quality includes trying to make metal tubing so uniformly and welding it so consistently that not one of the hundreds of fuel rods in a reactor leaks any detectable amount of radioactive byproduct. The number of CNFD customers experiencing such error-free fuel-rod performance has grown 50 percent over the past two years and is planned to grow another 50 percent over the next two.

Achieving such perfect performance requires zirconium alloy tubes whose wall thickness never falls below safe minimums and utterly precise formulation of the uranium pellets themselves. This is ac-

complished by employees who are dedicated to manufacturing perfection and whose work is supported by a wide range of computer-related technologies, according to James Fici, the division's total quality planning manager.

Many elements of CNFD's quality-control and -measurement technologies are available essentially off the shelf: laser and ultrasonic measuring equipment, computer-controlled metal-working machines, and the computers that digest and interpret the data generated by these devices. But in some cases the division has had to invent its own technology, as was the case with the process that transformed the zirconium alloy stock into seamless tubing. The metal-forming machine that does the heavy work is a common item in metal shops, producing uncounted miles of copper, steel and alloy pipe for years. What makes Westinghouse's stand out is the expert system that helps the operator continuously fine-tune its operation.

"Our most experienced operators knew how the machine should sound moment by moment [and] what knob to tweak [in order] to keep things within nominal dimensions," Fici said. The expert system recorded that knowledge, then put it in a form that could coach other operators to respond to changes in the process, making their performance much more consistent too. "It's always amazed me how such a large, awkward-looking machine can produce a product of such fine tolerance," Fici said.

While manufacturers often have concrete criteria on which to base their quality benchmarks, service providers generally must deal in subjective measures. They depend on such procedures as consumer interviews and surveys to paint their quality portraits and gauge their efforts indirectly by tracking items

SNAPSHOT: Xerox Corp.

Quality in Triplicate

Xerox embodies three key pieces of a strategy to innovate through an emphasis on quality

Three elements are common to the most successful and far-reaching quality reformations in American business:

- The impetus for change comes from the top of the corporate hierarchy—usually the chief executive officer—and it is supported by senior management.

- The effort includes a carefully thought-out campaign to change the ways people think about and perform their jobs.

- Advanced information technology is the facilitator—not the cause—of progress.

Nowhere are these elements in clearer evidence than at Stamford, Conn.-based Xerox Corp., whose quality-improvement drive has been recognized by independent judges on three continents. Xerox has thrived in world markets while under intense challenge from the Japanese, gaining market share and preserving profits not by becoming the most automated firm in its industry, but by improving its management and organization to the limits enabled by advanced information technology.

"This has everything to do with technology management," said Patricia C. Barron, Xerox's vice president of corporate information management. "Too of-

ten people think that if they've gotten the technology right, they've gotten the program right. They don't think about training . . . or the re-engineering of the business process."

The single-most important quality criterion is customer satisfaction. Since the program was initiated in 1984, Xerox's customer-satisfaction measures recorded a 35 percent increase—with some seven customers in eight now happy with Xerox's performance. The company also reduced manufacturing costs by 20 percent and shortened its new-product time-to-market by 60 percent.

Some of that advance did occur as a direct result of the use of information technology. For example, Xerox now offers a service that allows its computers to monitor the performance of specially equipped copiers in the field, in order to predict the repair and maintenance needs of those machines and to schedule service before breakdowns can occur. Customers have been enthusiastic about the monitoring service, Barron said. The company's Internal Satisfaction Index showed a three-point rise since the operating enhancement was introduced a year ago—at a time when gaining even an additional one-point



PATRICIA C. BARRON: "a culture of solving problems closest to where they are experienced."

rise is "a major challenge," she added.

More of the Improvement was the result of initiatives that made only peripheral use of IT. The company established centrally coordinated "competency centers," in which teams of experts look at new technologies to identify potential business opportunities and applications for all business units. Another program is geared toward benchmarking the competition, with researchers carefully going over other vendors' products to learn as much about them as possible.

Most of all, the change

at Xerox is a change in the corporate culture and people's attitudes. "We are developing a culture of solving a problem closest to where that problem is experienced," Barron said. "When you empower people, they will often come up with much more innovative solutions. They're the ones that benefit the most and know the most about what needs to be improved."

The force for that change comes from the top: the office of Chairman David T. Kearns, according to Barron. Kearns's business objectives, she said, are first, customer

satisfaction; second, return on assets; third, market share; and fourth, employee satisfaction.

As for her own role as CIO in reaching those objectives, Barron said that it's mostly a matter of showing her peers that their efforts will be stronger and more effective if they exploit the power information technology can offer. "We need to be internal salespeople," she said. "We can't peddle bits and bytes and baud rates; we've got to talk about—and demonstrate—real business importance in real business terms."

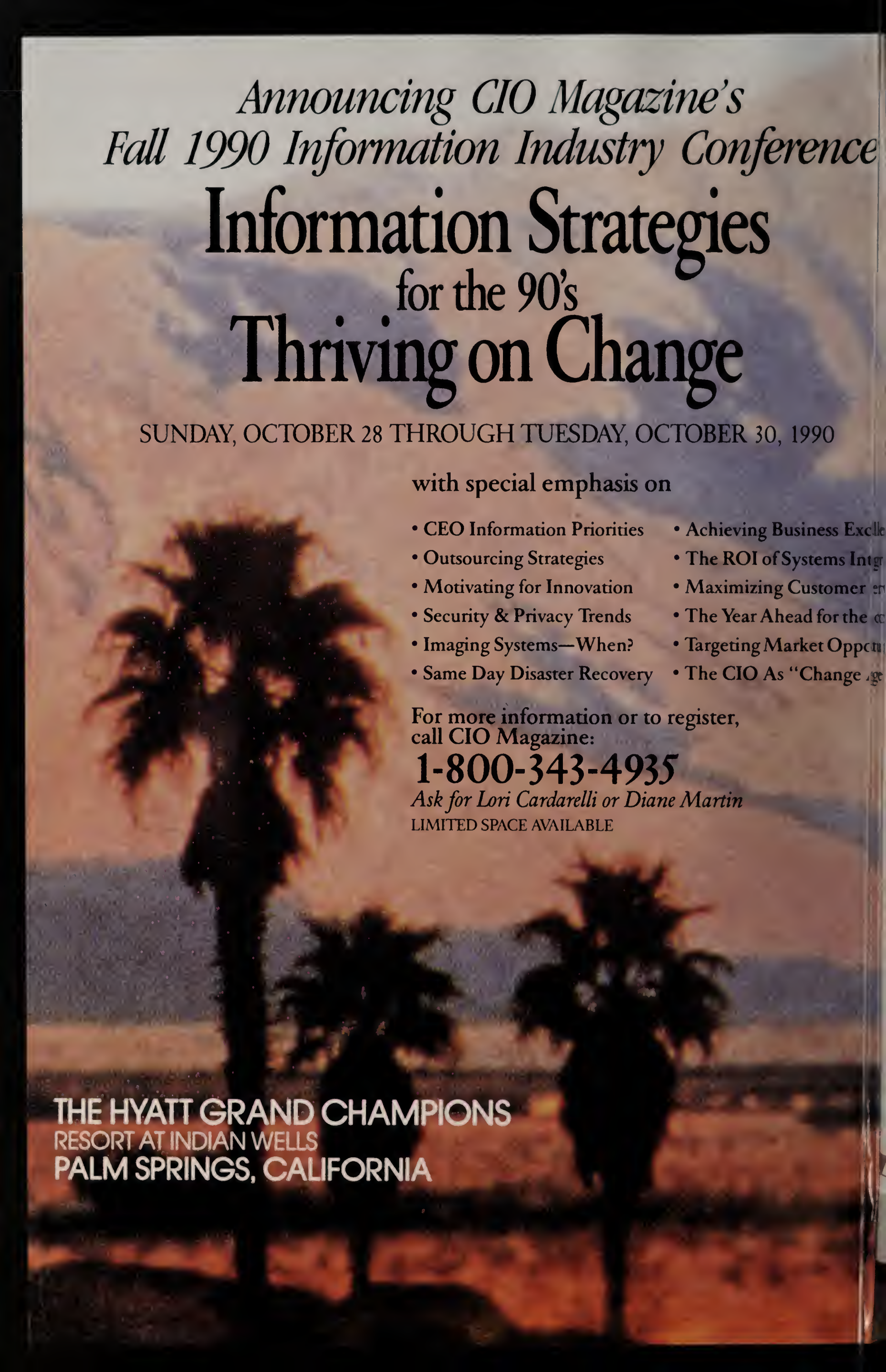
—P. KONSTADT

such as repeat business.

At the New England Medical Center, according to Tarte, "we are developing a program that will allow us to take [patient survey] data, . . . then provide input back so that the clinician can look at the type of things we're doing. We ask [patients], 'Did you receive good patient care?' and, 'How are you feeling now after the surgery?' [We need to know] not just the procedures but the human side—how people react to what we do. We want to better identify the things we do very well."

A comparable approach serves **Stew Leonard's**, a Norwalk, Conn., food and dairy operation that recorded \$108 million in sales last year. "We use focus groups and informal customer surveys . . . as well as hard data" from the store's advanced inventory-tracking and customer-checkout system, said President Stew Leonard Jr. "You can't make decisions solely based on computers or you'll be making them in a vacuum."

A similar attitude prevails at **Blue Cross and Blue Shield of Minnesota** in St. Paul. Faced with growing dissatisfaction over the high cost of conventional health insurance, the Minnesota Blues revamped their product line, with a policy that allows consumers to pay extra for high-cost or unconventional options but to save money sticking to limited basic care. According to Alfred D. Anderson, the insurers' vice president of information systems, while IT has made it easier to administer the plan, its role has been secondary. "Computers need some fairly intelligent folks to know what questions to ask, to analyze the answers, and to know what it means," he said. "Twenty-five years ago we had the same number of subscribers, one-fourth the employees and no computers. You can do almost anything without [computers] if you have to." CIO



*Announcing CIO Magazine's
Fall 1990 Information Industry Conference*

Information Strategies for the 90's Thriving on Change

SUNDAY, OCTOBER 28 THROUGH TUESDAY, OCTOBER 30, 1990

with special emphasis on

- CEO Information Priorities
- Outsourcing Strategies
- Motivating for Innovation
- Security & Privacy Trends
- Imaging Systems—When?
- Same Day Disaster Recovery
- Achieving Business Excellence
- The ROI of Systems Integration
- Maximizing Customer Service
- The Year Ahead for the CIO
- Targeting Market Opportunities
- The CIO As "Change Agent"

For more information or to register,
call CIO Magazine:

1-800-343-4935

Ask for Lori Cardarelli or Diane Martin

LIMITED SPACE AVAILABLE

THE HYATT GRAND CHAMPIONS
RESORT AT INDIAN WELLS
PALM SPRINGS, CALIFORNIA

- CEO Information Imperatives
 - Outsourcing Strategies
 - Motivating for Innovation
 - Security & Privacy Trends
 - Imaging Systems — When?
 - Competitive Communications Strategy
 - The CIO As “Change Agent”
 - MEGATRENDS 2000
 - Achieving Business Excellence
 - The ROI of Systems Integration
 - Same Day Disaster Recovery
 - Maximizing Customer Service
 - Targeting Market Opportunities
-

The Hyatt Grand Champions Resort at Indian Wells

Sunday, October 28 — Tuesday, October 30, 1990

PALM SPRINGS, CALIFORNIA

PLEASE CALL (800) 343-4935.

Ask for Lori Cardarelli or Diane Martin

Registration in MA call (508) 872-8200.

You may return this form by mail

To: CIO MAGAZINE

492 Old Connecticut Path

P.O. Box 9208

Framingham, MA 01701

A Business Reply Form is enclosed for your convenience

Registration Fees & Confirmation:

Individual Fee: \$995 (Early Bird \$895)

Group Rate (3 or more): \$895 ea. (Early Bird \$875)

Spouse Registration: \$100

Registration fees must be paid in advance of the meeting. Fees include all meeting materials and food/beverage for all scheduled events. Travel and hotel expenses are the responsibility of attendees. Please do not come to the meeting without advance confirmation. We reserve the right to limit enrollment so the objectives of all attendees will be achieved.

Government/Military Registrations:

Individual Fee: \$1350 (Early Bird \$1250).

Team of 3 or more: \$1250 ea. (Early Bird \$1150 ea.)

Government/Military Registration fees include lodging at the Hotel at the standard room rates for the nights of October 28 and 29, Meals (other than in scheduled events) are not included.

☐ This is a Government/Military Registration

Conference Attire:

Casual! One of the main objectives is to relax and be comfortable in the total immersion "CIO University" setting. Ample time is scheduled for networking informally with your colleagues, faculty resources and your hosts. So bring your sports clothes. And, since most of our evening functions are outdoors bring a jacket or sweater as the desert cools down at night. Special Event Attire: Western!

Note: Please keep a photocopy of this form if registering by mail.

NAME

TITLE

NAME

TITLE

☐ This is an EARLY BIRD REGISTRATION

(Prior to October 1, 1990)

☐ Payment Enclosed ☐ Please Bill Company

Make Check Payable to CIO/AMR Conference

And send to: Box D-3390

Boston, MA 02241-3390

If you wish to register by credit card, please fill in:

Acct No: _____

☐ AMEX ☐ MC ☐ VISA Exp _____

Please indicate your arrival/departure plans:

Arriving on: ☐ Fri, Oct 26 ☐ Sat, Oct 27

☐ Sun, Oct 28

Departing on: ☐ Tues, Oct 30 ☐ Weds, Oct 31

Hotel Accommodations & Meals:

Room reservations and hotel charges, including food & beverage costs (except for scheduled events) are the responsibility of attendees. A block of guest rooms for participants has been reserved at the Hyatt Grand Champions Resort and at Stouffers Esmeralda next door. You should promptly notify the hotel at the number below. Advise the hotel that you will be attending the CIO/AMR Conference. Call (800) 233-1234 and ask for the Resort Operator.

Directions will be sent with your registration materials.

☐ Downsizing Your Applications Platforms to Run Lean in the '90s

☐ Criteria for Corporate-Wide Modernization of Information Systems

☐ Top Management Criteria for Hiring Today's CIO

☐ Outsourcing as a Strategic Option

Tuesday, October 30 (check 2):

☐ Trusting Third Parties with Your Integration Projects

☐ Systems Integration and Data Management: Enterprise Support for the '90s

☐ New Trends in Structuring Executive Compensation

☐ Measuring Customer Response and Controlling the Evolution to End-User Computing

☐ Strategy-Driven Systems

☐ Implementing the Successful Executive Information System...the Xerox Experience

Recreation Interests:

Check if appropriate:

☐ Golf on Sun. Oct. 28

☐ Self ☐ Spouse ☐ Both

☐ put me/us in a foursome

(look for our Recreation Desk when you arrive)

☐ Tennis on Sun. Oct 28

☐ Self ☐ Spouse ☐ Both

☐ Spouse Off-Site Excursion into Palm Springs ..Gallery/Boutique Tour

☐ Mon, Oct 29 2-5 PM

☐ Tues, Oct 30 2-5 PM

Cancellation Policy:

There is a cancellation/registration penalty of \$250. You may cancel your registration without further penalty up to 10 business days prior to the meeting. If less than 10 business days, you are liable for the entire fee, which is not refundable but may be applied to future CIO/AMR Conferences.



Advance Registration Form

☐ **YES!** Please register me (us) for the CIO Conference, October 28-30, 1990. I understand that once payment is received, registration will be officially confirmed and all advance materials will be forwarded to me (us).

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

SIGNATURE _____

DATE _____

PHONE () _____

FAX () _____

☐ My spouse will be joining me. NAME _____

WE LOOK FORWARD TO HAVING YOU WITH US!

Three easy ways to register:

You may register by FAX
FAX this form to (508) 872-0618 or
(203) 661-8472

Additional Registrations:

Please register the following individuals who
will also be attending:

NAME _____

Information Strategies
for the 90's

Thriving on Change

PALM SPRINGS

Hyatt Grand Champions



American Airlines knows
the way to Palm Springs.

American Airlines is the Official Conference Carrier.
Use this Group Discount No. to receive the most
favorable fare: AA Star File No. S14004S. Call
(800) 433-1790. Further details will be sent when
you register.

**Additional Registration
Information**

Please Complete Where Noted:

**Conference Concurrent
Sessions:**

Please indicate your interest in attending. Each con-
current session will be held twice.

Monday, October 29 (check 2):

☐ Centralization vs. Decentralization for the IS

Organization

☐ Downsizing Your Applications Platform to Run

CIO Magazine & AMR International

are proud to present

The CIO
Information Industry Conference

Information Strategies
for the 90's
Thriving on Change



PRODUCT DEVELOPMENT (*n.*) **1:** the creation of something new that someone needs and wants to buy; **2 a:** encouraging employees at all levels to contribute fresh ideas; **b:** rewarding them for their innovations; **3:** using IT to integrate development phases and to maximize internal and external communication and information sharing

GETTING THE GOODS

BY AMY BERMAR

THE MAXIMS OF innovative product development might seem contradictory: After all, how does any company concerned with cutting costs keep quality high, encourage creativity and dig into its pockets to underwrite the brick-and-mortar investment that will be necessary to compete in the coming decade?

Yet these are the principles driving the best in the business to produce a cascade of new offerings.

Some of the more celebrated examples of innovative product-development include **3M** of St. Paul, Minn. (see feature, Page 22), with its 60,000-plus products and an institutional reputation for unfettered creativity.

Rubbermaid Inc. of Wooster, Ohio, ranks high on the innovation scale as well; ongoing

innovation is required to meet the corporate goal of having 30 percent of each year's revenue derive from products that didn't exist five years before. Others, like Maynard, Mass.-based **Digital Equipment Corp.**, trim development time by using technology to reduce organizational boundaries. For

all, the race is on to produce more goods of higher quality and with less waste than ever before.

The stakes are high: economic survival in a global marketplace that has little tolerance for unresponsive or bloated organizations. Defining and developing new products and services frequently means the difference between just staying even and acquiring the market share necessary to finance still more research.

So, despite the inherent bureaucratic tendency of most organizations to adhere to the status quo, innovative companies are constantly looking for ways to be more effective.

Five years ago, most CEOs might have dismissed **Motorola Inc.**'s quest for "Six Sigma" perfection—a 99.99998 success rate—as idealized and impossible. Today it's not only a reality at the Schaumburg, Ill., company; it's also a fast-emerging standard for scores of other corporations that rely on high quality to cut costs and keep discriminating customers satisfied.

As this zero-defects philosophy becomes ingrained in the executive psyche, it gradually permeates the entire company as well. From the back offices of IS centers to the increas-

ingly computer-process-controlled factory floor, the mission is to identify opportunities to "do it right the first time."

A ready supply of new ideas is essential to effective product development. Some companies, such as high-pressure water-jet manufacturer **Flow International Corp.**, based in Kent, Wash., have adopted innovative approaches to involving employees in the idea-generation process. In essence, Flow rewards employee innovators with their own business units. Anyone at Flow who comes up with a convincingly good idea for a new product is given seed money to start a spin-off company. Others, such as **Xerox Corp.** of Stamford, Conn., and **The Boeing Co.** of Seattle (see related story), enrich the decision-making process by using electronic links to share vital information corporatewide, uniting engineers, manufacturing and marketing specialists in teams that transcend physical, organizational and geographic obstacles.

Strong executive leadership can often cast the most obvious obstacles aside. John B. McCoy, the chairman of Columbus, Ohio-based **Banc One Corp.**, presided over his com-



ILLUSTRATION BY MARK FISHER

pany's effort to become unsurpassed in retail banking. Banc One pursued a strategy of growth by acquisition and by offering a flurry of new financial products and services. But it also broke away from relatively staid banking conventions with such stratagems as instituting Sunday hours at branch locations and promoting weekly "specials" on everything from CDs to Caribbean cruises (which the bank arranges through its own travel agency). Also, by specializing in retail banking, Banc One managed to avoid the non-performing real-estate loans and unpaid Third World debt that have plagued many larger banks.

Like Banc One, San Francisco clothing manufacturer **Levi Strauss & Co.** has reaped the benefits of specialization. After company executives spent \$1.5 billion to purchase the organization in a leveraged buyout in 1985, Levi Strauss trimmed its product line by two-thirds, closed 26 plants and cut its work force of 38,000 by 16 percent. It also focused on streamlining the manufacturing process and cutting the lead time on new orders. This was effected largely through the development of LeviLink, an EDI system that connects the company to its retailers and fabric suppliers. At the same time, Levi Strauss injected realism into the product-development process by recognizing an essential truth about many of its long-term and loyal customers: They were aging, and their bodies were changing. Marketers realized there was a need for a new line of clothing that retained the identity of the company's fabled denims while accommodating a wider girth. The result: a brand new product category that's now worth some \$500 million annually. Equally valuable is the brand-name recognition that's awarded to Levi Strauss as the first to claim this new niche.

The effective communication provided by electronic linkages is key to decision support in any industry, combating the isolation that deprives both corporate decision-makers and knowledge workers of essential data.

Microsoft Corp., the largest microcomputer software company in the world, links some 5,000 users on its corporate LAN in Redmond, Wash., putting its own products to use as it develops subsequent generations of software. The \$1.2 billion company considers its engineers among its most valuable resources. But because they're housed across a sprawling campus and assigned to various organizational units, bringing them together to work on a specific project requires some delicate bridging of boundaries. Microsoft's solution: independent work groups centered around a software-development server. All related development work is instantly accessible to those on the server, cutting the need for inter-organizational meetings and building a sense of community.

Similarly, the complex product development required in chip manufacture often places a high premium on planning and control. At **Cypress Semiconductor Corp.**, of San Jose, Calif., all daily activities as well as new-product development data are closely monitored on a central system, where even minor slippages are quickly detected.

Certainly, not every company keeps such close tabs on daily details—but many intend to; more than ever before, companies in every industry are targeting the 1990s as a decade of database integration. The goal: to give geographically dispersed departments and functions access to vital information.

Many of the companies developing distributed databases as a central goal already lead their fields in another mainstay of factory-floor technol-

SNAPSHOT:

The Boeing Co.

Automatic Pilot

From sketchbook to schematic to scheduled departure, Boeing's airplane of the future will be a computer-aided product

If Norm Collins is wrong, he could be out of a job—and a \$20.2 billion company could be flat on its back. But The Boeing Co. has a history of betting on the longshot, and this time the odds are big enough to justify some of the largest risks that the airplane manufacturer has ever considered embracing.

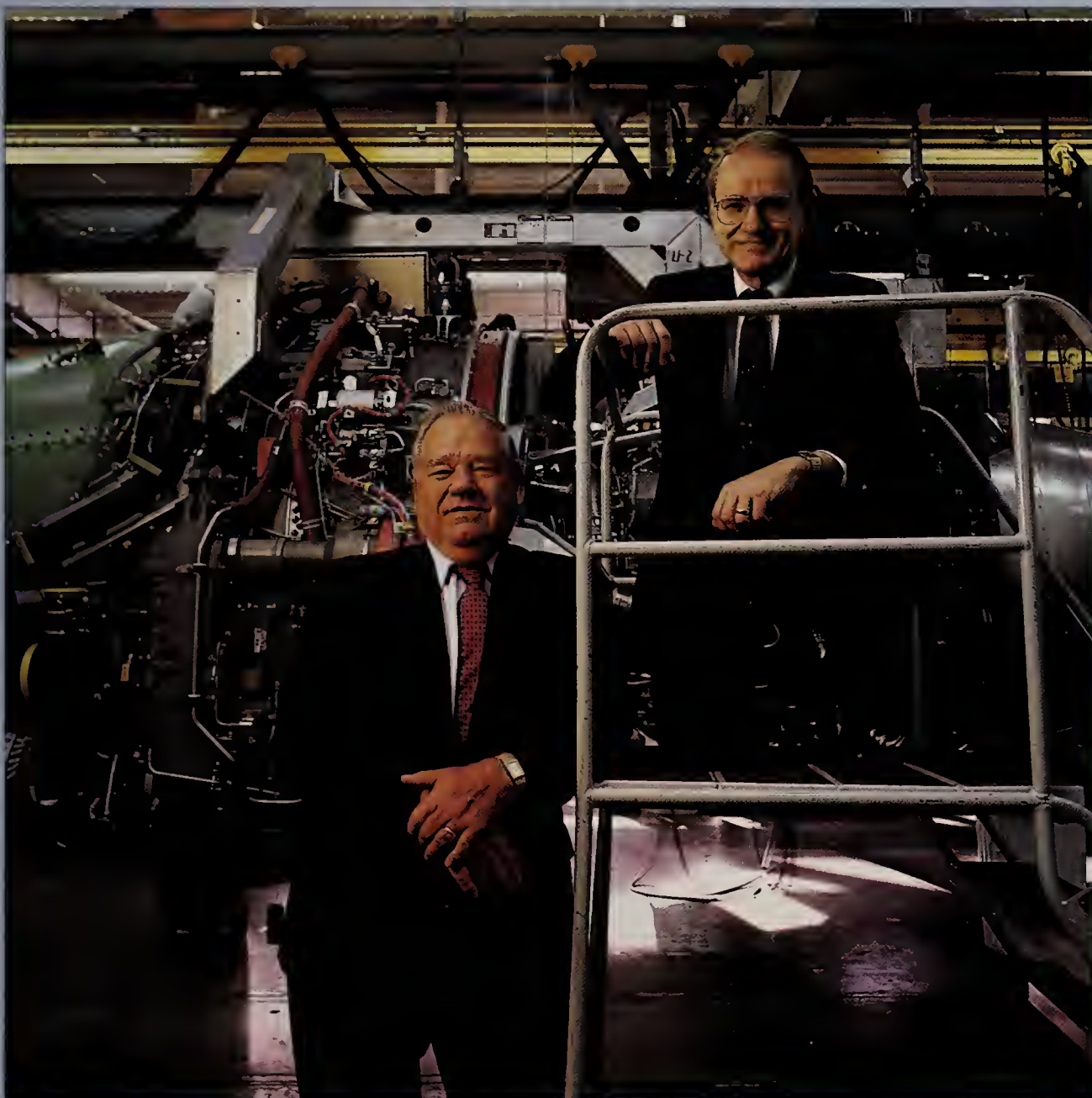
"If we fail, we will have set Boeing back in the marketplace by 20 years," said Collins, one of 100 or so IT strategists and project engineers who have helped redesign the very nature of Boeing's business with its first computer-designed and -manufactured jet. Known as the 777, this two-aisle, 350-seat plane is set to debut sometime in 1995. Within a few years, it's expected to become the centerpiece of a highly profitable product line—and is being counted on to help propel Boeing's fortunes through the middle of the 21st century.

Design of the 777, of course, is well underway in Boeing's Seattle headquarters and in several plants around the world. The project is supported by battalions of 3D workstations and a battery of linked databases, which, when fully integrated within the next few years, will electronically connect tens of thousands of de-

signers, engineers, mechanics and customer-support people for the first time. Mechanical drawings will be obsolete; more important, errors detected midstream in the design or manufacturing process will be remediable almost immediately.

From the first preliminary sketch to final assembly, everything will be based on digital information. And Collins, as the 55-year-old vice president of the Boeing Support Group for Boeing Computer Services, has the responsibility to make the pieces fit by designing a data-architecture framework to support the companywide database critical to this plan's success.

But even such a large undertaking, he said, isn't a problem for a company that he defines as "a large systems Integrator." Indeed, the typical jet consists of more than a million separate parts, and customization requirements usually dictate that no two airplanes are exactly alike. Moreover, the company, which already has developed enterprisewide networks to facilitate communication among departments, routinely crosses organizational boundaries to solve perplexing problems. "If Boeing has a strength," said Collins, "it's bringing together a lot of people



ARTHUR HITSMAN (left), president of Boeing Computer Services, and Boeing IT strategist NORM COLLINS

[from] different disciplines."

The 777 project is the brainchild of a dozen strategists who started sharing ideas back in the early 1980s; by 1985, the first digital pre-assembly pilot program was launched; before long, another 80 engineers, IS professionals and designers were suggesting additional refinements.

All along, the participants have merely been responding to a corporate culture that endorses creative problem-solving. At Boeing, SWAT teams are created to attack special problems, and even in

day-to-day lab operation or on the factory floor, employees who come up with a better way to handle ordinary problems are usually given a chance to see if their ideas can work.

Those credited with a "breakthrough" design may be recognized with an award, a lunch with their department or a \$1,000 bonus. More routine praise comes as a pat on the back and additional respect from one's peers—not to mention the increased likelihood of promotion.

Indeed, the late founder Bill Boeing is frequently

quoted regarding the need to ferret out every possible good idea. "It behooves no one," he said several decades ago, "to dismiss any novel idea with the statement that it can't be done."

Collins, for his part, gives credit for this intellectual openness to the inherently competitive nature of an industry that relies on a constant supply of technical improvements to survive. "This company doesn't have a strategy for innovation," he said; "it has an environment that simply won't let people be complacent."

—A. BERMAR

ogy: CAD/CAM. They include defense contractor **Spire Corp.** of Bedford, Mass.; semiconductor manufacturer **Intel Corp.** of Santa Clara, Calif., and electronics manufacturer **Texas Instruments Inc.** of Dallas. But even in the most receptive climates, new ideas are rarely born of technology alone. Though advanced systems may make it easier to bring a new idea to fruition, most IS executives credit rank-and-file engineers for coming up with most of their latest products. Others manage to listen carefully to customers, who articulate real needs and, as a result, may help define vast new markets for modified products.

Still other companies take their lead from the CEO, who can establish an atmosphere that encourages the risk-taking that may lead to innovation. Flow International's drive to encourage employee innovation begins with the CEO's demand that the company as a whole surpass current engineering limits in the design of specialty water jets.

The result is a proven ability to meet the goal of keeping a two-year jump on the competition—and a 70 percent market share. "Our innovation is driven by the corporate culture," said Gerald E. Malmrose, MIS manager and director of manufacturing at the company, which had revenues of \$46 million last year. "The CEO," he added, "always wants to be a step ahead of anyone else in this field." CIO

Amy Bermar is a freelance writer based in Jamaica Plain, Mass.



PHOTOGRAPH BY RAYMOND GENDREAU

FIND YOUR NEXT SALE IN ITI'S UNIVERSE



There are hundreds of thousands of computer end-user sites in the United States. If that's your universe of potential customers, finding your next sale may feel like looking for a needle in a haystack.

Unless you start with Installed Technology International (ITI).

Our part of the universe is ITI's database of U.S. computer sites. We give you all the information you need to accurately identify your best prospects.

Even if you're using another source, you can't get the entire universe from any one supplier.

ITI clients tell us there's only 25% duplication between our database and our closest competitor's. And on those sites that do overlap, you'll find that ITI gives you fresher information including new or different prospect names.

Reach the person who wants to purchase your product! Here's how the information ITI collects will show you how to zero in on just the right prospects.

- **Spend less time looking for the right prospects and more time selling to them!**

ITI gives you: prospect names & titles — 274,917 key MIS/DP & general management contacts.

- **Mail and telemarket only to those prospects who need your product!**

ITI gives you: installed hardware and software by vendor and model, plus future buying plans — so you'll know if your product is a good fit.

- **The more you know about your prospects, the easier it is to aim your sales pitch directly at their needs.**

ITI gives you: company size, industry verticals, and corporate affiliations.

ITI also gives you 63,000 sites in Europe, Canada and Asia. So when you're planning your sales and marketing programs, plan on adding ITI to your mix.

Call Jan Kenz for a FREE brochure.

1-800-347-3484

INSTALLED TECHNOLOGY INTERNATIONAL

ITI is a sister company to CIO, and part of International Data Group's (IDG) worldwide family of publication, research and exposition companies.



INNOVATION IN JAPAN (*n.*) **1:** American business now emphasizes customer service, but Japanese business is built around it; **2:** this means cutting development time, tailoring products to individuals and networking operations

JAPAN INC. BOWS TO THE CUSTOMER

BY DENNIS NORMILE

WHAT DRIVES Japanese innovation? One way or another, it usually comes down to serving the customer.

Honda Motor Corp. Ltd. established its beachhead in motorcycles by sending its engineers to bikers' rallies to find out what they looked for in a bike. Honda took that approach from motorcycles to cars and eventually made its Accord the best-selling car in America.

Kyocera Corp. became the leading supplier of ceramic semiconductor housings by tailoring chip packages to the needs of each customer, no matter how small. It grew with its customers and now has 67 percent of the U.S. market for chip packages.

Toshiba Corp., anxious to expand its presence in computers, sent a team of engineers to the United States to ask distributors and marketers what was wrong with then-current personal computers. "They're too big," was a common reply. Toshiba put a winning collection of features into a small package and made

the industry sit up and take notice. The company now turns out 70,000 laptops a year and is reckoned to have nearly 40 percent of the market worldwide.

"We created the market for this product," said Koji Okamoto, general manager of Toshiba's total information and systems division. But, he added, there was no "direct connection" between that success and information technology.

Okamoto and other Japanese information executives think information technology is important, that it has a vital role to play in innovation. But it is a supporting role. Time after time, managers in Japan say that it is customer satisfaction that drives the continual development of new services and products.

But if IT is not the mother of innovation, it may be the midwife. Consider automobiles. "People want individualized products," said Masashi Ohara, general manager of **Toyota Motor Corp.**'s first information division. "Volkswagen built the same model for 20 years. You couldn't get away with that in Japan today. Last year's models already

feel old."

The ability to consistently turn out new models in ever-greater variety is becoming a key to the auto business. And as Ohara said, "These days, you just can't develop new models without computers."

Of course, the Japanese automakers all use computer-aided design, engineering and manufacturing (CAD, CAE and CAM). This results in increased precision, higher quality and greater efficiency. Increasingly, information systems are being used to boost the speed of getting from concept to market.

Ohara said that Toyota takes a car from concept to market in three to four years. Analysts say it takes the U.S. Big Three at least five. And Toyota is moving to squeeze more time out of the process. Supercomputer simulation is replacing actual testing for impact, noise and wind drag.

Potentially greater efficiencies may come from tying suppliers into Toyota's computer network. Ohara said that Japanese automakers now depend on suppliers to design as well as manufacture the parts they make for the car companies.

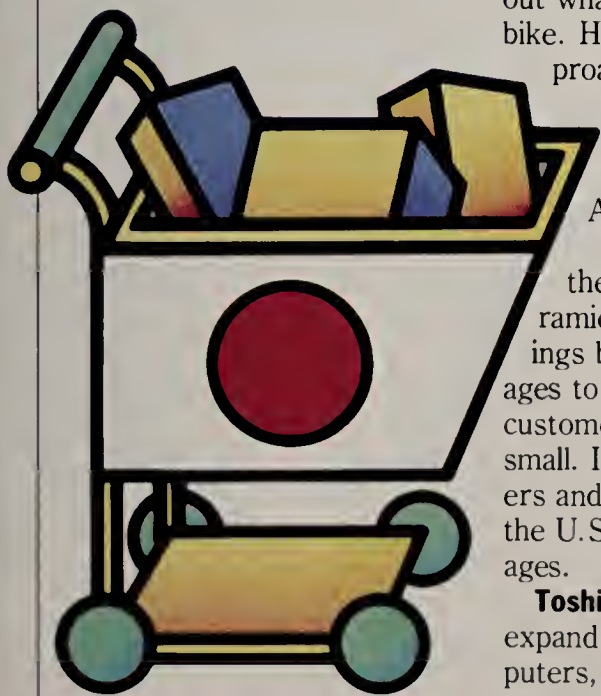


ILLUSTRATION BY MARK FISHER

At present, the time it takes to transfer technical specifications to suppliers is slowing the process down. The barrier to effective information transfer with suppliers has been the technology investment; many of Toyota's suppliers are small firms that find it hard to meet the expense of systems. However, CAD/CAM workstations and software have now become inexpensive enough for these smaller companies. The next step is to integrate their equipment into Toyota's network.

Toyota already has its dealers online. They must fore-

.....

"People want individualized products. Volkswagen built the same model for 20 years. You couldn't get away with that in Japan today."

—Masashi Ohara

.....

cast demand to place orders. But once they have a car slotted for production, they can change the details to suit what customers order, up to a few days before manufacture.

Car industry analysts in Japan foresee these trends leading to a point at which customers will virtually design their own cars from menus of options at their dealers. The information will go online to the factory, and the actual car will be manufactured to the customer's specifications. "This is not a fantasy," one industry watcher said; "it's right around the corner."

Manufacturing is not the only area where speed is becoming critical. "We must increase the speed of business communications," said Kazuo Yokohama, a manager in **Sony**

Corp.'s management and operations systems group.

Sony was one of the first Japanese companies to go overseas, and it has sales operations, manufacturing plants, and design centers scattered around the world. Sony is in the midst of a four-year program to build a network that will interconnect affiliates, subsidiaries, factories and design centers worldwide. A part designed in Japan may be made in Thailand for a product assembled in California. Without a good network, the efficiency of operating globally would not exist.

Stitching varied and far-flung operations together poses some challenges to the innovative abilities of the operations group itself. "Up to now, factories have selected what they needed to make their own systems work," Yokohama said. "What is right for an audio-tape plant is not right for a TV plant."

There is a Sony unification discussion group to work out specifications for interfaces. "In the future," said Yokohama, "every operation will have a system that meets its own needs but still is interconnected."

Of course, giving every operation a system that meets its needs is just the principle of satisfying the customer applied within the company. And most Japanese IS divisions see it just that way.

Toshiba's Okamoto said that it's his job to help each of the company's 11 corporate groups gather customer feedback. But when those customers range from housewives buying toaster ovens to giant utilities buying nuclear power plants, the information systems must be tailored to suit.

"Every customer has their own needs," Okamoto said. "What are their expectations? What will they consider good service?" Every business group has to answer those questions, and the IS division must then help them imple-

SNAPSHOT:

Shiseido Co. Ltd.

Best Face Forward

A cosmetics maker uses notebook-sized computers to help its smaller independent retail outlets stock the ideal array of products

The innovative product of one CIO-100 company has become the innovative tool of another.

Shiseido Co. Ltd., Japan's largest cosmetics maker, is using Toshiba Corp.'s hot-selling Dynabook notebook computers to speed the flow of information between the company and the tens of thousands of small shops that sell Shiseido products.

The aim is to fine-tune the product mix and closely monitor feedback to keep customers satisfied and sales growing.

Shiseido's 15 sales subsidiaries and their 105 sales-support centers have been online with the head office for years. Sales at department stores and the larger chain stores are tracked through point-of-sale systems.



But the glaring gap in the system was the 25,000 independently owned stores that sell Shiseido products—what Shiseido calls its voluntary chain stores. The stores are too numerous and the individual sales too small to make POS terminals in each store cost-effective. But Shiseido realized that potentially valuable data wasn't flowing into or out of the loop.

The solution was the Toshiba Dynabook computer. The notebook-sized computers are small enough to be carried to the stores by sales representatives on their rounds. "We waited for this for a long time," said Masatoshi Takemoto, general manager of Shiseido's information systems division.

Sales personnel download information from the sales divisions' computers in the morning, make their rounds, and then upload gathered information at night.

Shiseido has always looked at its outlets as partners. And the sales force plays a role that is close to consulting. "They help the store managers plan sales strategy," he said.

With the computers, the sales force can supply shop managers with the latest information on sales trends, broken down by region, age group and other factors. Together, the sales rep and the shop manager will be able to compare what is selling elsewhere against each shop's results.

The aim is to help the store owners base their

buying decisions more on solid data and less on instinct. With more than 3,500 items, Shiseido has cosmetics, beauty aids and toiletries to suit every need. But with incredibly tight shelf space, each store can only stock a limited number of Shiseido products. The challenge is getting the right mix of products on the right shelves.

"In the past, we've not always been successful matching the products offered [in a store] to the needs of its customers," Takemoto said. "By studying the customer and aiming carefully, the success rate will go up."

Another part of the challenge is getting the shop owners used to dealing with the newfangled machines. This is a group that may still have a *soroban* (Japanese abacus) behind the counter.

"You have to take an educational approach," Takemoto said. "When we designed the software, as much as possible we avoided complicated use of the keyboard."

But once both the sales staff and the store owners are familiar with the first version of the program, Shiseido intends to upgrade it. "This is just the first version, so we made the operation simple," Takemoto said. "But from here on, . . . if we don't make it a bit more involved, it won't serve our purposes."

The ultimate aim is to use the information to constantly refine the product mix. In essence, Shiseido will constantly improve its information handling in order to constantly improve its aim on the customer.

—D. NORMILE

MASATOSHI TAKEMOTO: Technology helped turn sales force into consultants.

ment answers. But there is still the challenge of convincing everyone within the corporation of the value of implementing an information strategy. "If top management doesn't have that awareness," said Hidenori Ohkubo, also of Toshiba, "you can't accomplish much."

This would not seem to be a problem at Toshiba. Okamoto reports directly to the president. And Ohkubo is specifically charged with plotting the company's IS strategy. But other Japanese companies are just beginning to catch on. In a recent report, consultant Arthur D. Little Inc. (Japan) estimated that in general, "aside from manufacturing, Japanese SIS [strategic information systems] development is about five years behind that in the U.S."

Part of the reason is that getting used to computers is a bigger jump for Japanese. Written communications in Japan skipped the mechanical stage. Until the advent of Japanese electronic word processors a decade or so ago, business letters were written by hand. The 2,000 kanji characters needed for routine communications proved just too unwieldy for a typewriter-like device.

This is why what's called "keyboard allergy" in Japan is far more widespread than any computer aversion in the States. "Years ago I used to envy Americans; everyone could type," said Tadao Ito, general manager of information systems for **Toray Industries Inc.**

Toray, a leading synthetic-fiber maker, finds that computer training becomes extremely important under the circumstances. The company has three levels of training for employees, depending on their level of involvement with information systems. At the most basic level is training for using spreadsheets and databases. The next level is for the technical specialists who will work

with applications programs in their respective fields. And then there is training for those who will be putting the systems together: the systems engineers.

"Innovation and information systems have a deep connection," said Ito; "promoting the

.....
*The day will come
when customers
design their own
cars from menus of
options at their
dealers. The
actual car will
be manufactured
to the customer's
specifications.*
.....

strategies of various departments depends on it." Ito's role is especially challenging as Toray is aggressively diversifying and expanding into a variety of consumer products. Each new business brings its own information technology-related needs. That forces a kind of innovation on the IS department.

"Those departments need new information technology and new system concepts," Ito said. "From management's standpoint, we realize we can't do everything; it is our job to decide what is most important."

At most Japanese companies, the effort to better serve customers guides those decisions. "We're out to set up an efficient system to enhance customer satisfaction," said Toshiba's Ohkubo. "From our standpoint, making the customer satisfied is the biggest point." ☐

Dennis Normile is a freelance writer and English teacher based in Tokyo.

PHOTOGRAPH BY CAROLINE PARSONS/GAMMA LIAISON



MEET THE JUDGES

The panelists who helped select this year's CIO 100 organizations are noted for their knowledge of business innovation

John Ball

Staff director and chief counsel
Committee on Small Business,
U.S. Senate Washington

Jon Baron

Counsel
Small Business Committee, U.S.
House of Representatives
Washington

Zenas Block

Clinical professor of management,
Stern School of Business & founder
of the Center for Entrepreneurial
Studies
New York University
New York

Vicki Brown

Vice president of systems research
International Data Corp.
Framingham, Mass.*

Robert Burgelman

Associate professor of management
& co-director of the Stanford
Program on Managing Innovation
Stanford Graduate School of
Business
Stanford, Calif.;
author of *Inside Corporate
Innovation and Strategic
Management of Technology and
Innovation*

David Card

Director of systems research
International Data Corp.
Framingham, Mass.*

Martin P. Charns

Professor
School of Public Health, Boston
University
Boston

David Churbuck

Associate editor
Forbes magazine
New York

Paul Cockle

Chief European economist
Data Resources Inc.
London

Gustaf Delin

President
The ForeSight Group
Sigtuna, Sweden

Jeff Goldsmith

President
Health Futures Inc.
Deerfield, Ill.

Jeffrey Hallett

President
The Present Futures Group
Falls Church, Va.;
author of *Work-Life Visions*

Peter Keen

Executive director
International Center for Information
Technologies
Washington

Dorothy Leonard-Barton

Associate professor
Harvard Business School
Boston

Harold J. Levitt

Professor emeritus of organizational
behavior and psychology
Stanford Graduate School of
Business
Stanford, Calif.;
author of *Corporate Pathfinders*

Ted Lettes

Director of advanced manufacturing
Office of Technology
Commercialization, Department of
Commerce
Washington

Robert Mast

Vice president of corporate services
Venture Economics Inc.
Needham, Mass.

Ted Murray

Associate professor of management
policy
Graduate School of Management,
Boston University
Boston

David P. Norton

President
Nolan Norton & Co.
Lexington, Mass.

Austin K. Pryor

President
The ForeSight Group
Greenwich, Conn.

Edward Roberts

Director
Management and Technology
Program, Massachusetts Institute of
Technology
Cambridge, Mass.

Randall Root

President
Root Publishing
Perrysburg, Ohio

Jake Schlessinger

Staff reporter
The Wall St. Journal Tokyo Bureau
Tokyo

Jeffrey Seglin

Senior editor
Inc. magazine
Boston

William K. Schierer

Economist
Small Business Administration
Washington

Richard Schoen

Deputy division director
Industrial Science and Technological
Innovation Division, The National
Science Foundation
Washington

John Sifonis

Vice president
Temple, Barker & Sloane Inc.
New York;
(managed MIT's Management in the
1990s project)

Sally Solo

Reporter
Fortune magazine
New York

Bruce Stephen

Manager of the PC hardware
program
International Data Corp.
Framingham, Mass.*

Andrew H. Van de Ven

Director of the Minnesota Innovation
Research Program
Carlson School of Management,
University of Minnesota
Minneapolis

Charlie Whipple

President
C.T. Whipple Co.
Saga Koto-Ku, Japan

**These consultants voted on
computer companies only*

SUBSCRIBE TODAY!



The basic one-year subscription rate for *CIO Magazine* is \$63. Published monthly.

SUBSCRIBE AND SAVE.

~~\$63~~ **\$49**

Yes, enter my one-year subscription to *CIO Magazine* and bill me later for only \$49, a savings of almost 50% off the cover price.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

3-11a



The basic one-year subscription rate for *CIO Magazine* is \$63. Published monthly.

SUBSCRIBE AND SAVE.

~~\$63~~ **\$49**

Yes, enter my one-year subscription to *CIO Magazine* and bill me later for only \$49, a savings of almost 50% off the cover price.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

3-11b



The basic one-year subscription rate for *CIO Magazine* is \$63. Published monthly.

SUBSCRIBE AND SAVE.

~~\$63~~ **\$49**

Yes, enter my one-year subscription to *CIO Magazine* and bill me later for only \$49, a savings of almost 50% off the cover price.

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

3-11c

**PROCESS
IMMEDIATELY**



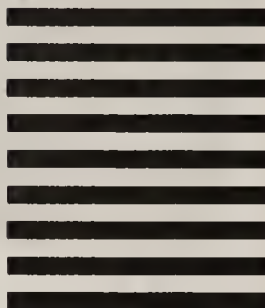
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9900



**PROCESS
IMMEDIATELY**



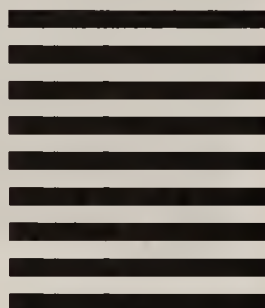
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9900



**PROCESS
IMMEDIATELY**



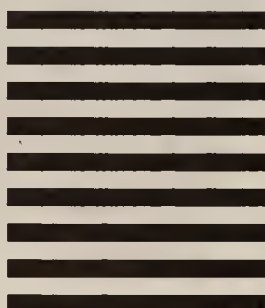
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9900



SUBSCRIBE TODAY!



THE CIO 100— WHERE TO FIND THEM

Page numbers refer to the first page of the article(s) in which the company is mentioned.

3M	22, 44, 67, 87	Federal Express Corp.	44	Otis Elevator Co.	44
Alza Corp.	44, 67	Fiat SPA	44, 71	Procter & Gamble Co., The	44, 75
American Airlines Inc.	44	Flow International Corp.	44, 87	Progressive Corp., The	44, 75
American President Companies Ltd.	44	Ford Motor Co.	44, 71	Reynolds Metals Co.	44
Apple Computer Inc.	44	Frito-Lay Inc.	44, 63	Rubbermaid Inc.	44, 67, 87
Applied Biosystems Inc.	44	Gillette Co., The	44	SAS Airline	44
Asea Brown Boveri	44	Glaxo Holdings PLC	44	AB SKF	44, 57, 63, 71
Atlantic Richfield Co.	44	Globe Metallurgical Co.	44	S-K-I Ltd.	44, 75, 79
Banc One Corp.	44, 75, 79, 87	H.B. Fuller Co.	44	Seibu Saison Group	44
BellSouth Corp.	44	Hewlett-Packard Co.	44, 79	Shiseido Co. Ltd.	44, 91
Ben & Jerry's Homemade Inc.	44, 67, 75, 79	Hillenbrand Industries Inc.	44	Sony Corp.	44, 91
Benetton SPA	34, 44	Honda Motor Corp. Ltd.	44, 91	Spire Corp.	44, 67, 87
Blue Cross and Blue Shield of Minnesota	44, 83	IBM Corp.	44, 67	St. Joseph Health System	44
Body Shop Inc., The	44, 79	IKEA International A/S	44	Statoil	44
Boeing Co., The	44, 87	Intel Corp.	34, 44, 67, 87	Stew Leonard's	44, 79, 83
Bose Corp.	44	Johnson & Johnson	44	Stride Rite Corp.	44, 63, 75
British Airways PLC	44, 79	Kimberly-Clark Corp.	44, 71	Sun Microsystems Inc.	44
C&J Industries	44	Kyocera Corp.	44, 91	Texas Instruments Inc.	44, 67, 87
Canon Inc.	44	L.L. Bean Inc.	44, 79	Thermo Electron Corp.	44, 57, 63
Cargill Inc.	44, 79	Levi Strauss & Co.	44, 57, 87	Thomson Tour Ops. Ltd.	44
Chaparral Steel Co.	44	Lotus Development Corp.	44, 57	Toray Industries Inc.	44, 91
Citicorp.	44	MCI Communications Corp.	44, 57	Toshiba Corp.	44, 91
Compaq Computer Corp.	44	MIPS Computer Systems Inc.	44	Toyota Motor Corp.	22, 44, 91
Corning Inc.	44, 57, 67	Merck & Co. Inc.	44	Turner Broadcasting System Inc.	44
Covia	44	Mercury Stainless Corp.	44	U.S. Army Health Services Command	44, 57
Cray Research Inc.	44	Microsoft Corp.	44, 87	United Services Automobile Association	44, 75
Cypress Semiconductor Corp.	44, 57, 63, 83, 87	Milliken & Co.	44	Valspar Corp., The	44, 63, 71
Digital Equipment Corp.	44, 63, 87	Millipore Corp.	44, 57, 63	Wal-Mart Stores Inc.	44, 63, 71, 79
Dow Chemical Co.	44	Motorola Inc.	44, 71, 83, 87	Walt Disney Co.	44
Dun & Bradstreet Corp., The	44	Mrs. Fields Inc.	44, 57	Wells Fargo & Co.	44
AB Electrolux	44, 71	NEC Corp.	44	Westinghouse Electric Corp./	
Emerson Electric Co.	44	New England Medical Center	44, 83	Commercial Nuclear Fuel Div.	44, 83
		Nintendo Co. Ltd.	44	White Memorial Medical Center	44
		Nippon Steel Corp.	44	Xerox Corp.	44, 71, 79, 83, 87
		Nissan Motor Co. Ltd.	44		

Some businesses are so dependent on their communications system that when a disaster suddenly strikes they lose ev

unless they've discovered how to

protect their business systems the Intelligent way.

With a customized disaster prevention and recovery program from Bell Atlantic. Where hot and cold sites are provided when needed. And where networks, computers and phone systems are quickly repaired or replaced when

damage does occur. Preventing interruptions in service, negative customer response and incalculable losses.

All via Bell Atlantic and its Intelligent network^Q.
Pretty smart, huh? network

Intelligent
QSM

© Bell Atlantic
We're More Than Just TalkSM

Call 1-800-522-6617 to get our Intelligence on the line.

Make The Most Of Your Editorial Coverage With Reprints From CIO

Coverage in CIO of your company's products, services or innovative activities means valuable exposure in a broad spectrum of markets. Build on the positive impact by ordering your reprints today.

Editorial reprints make great leave-behinds for:

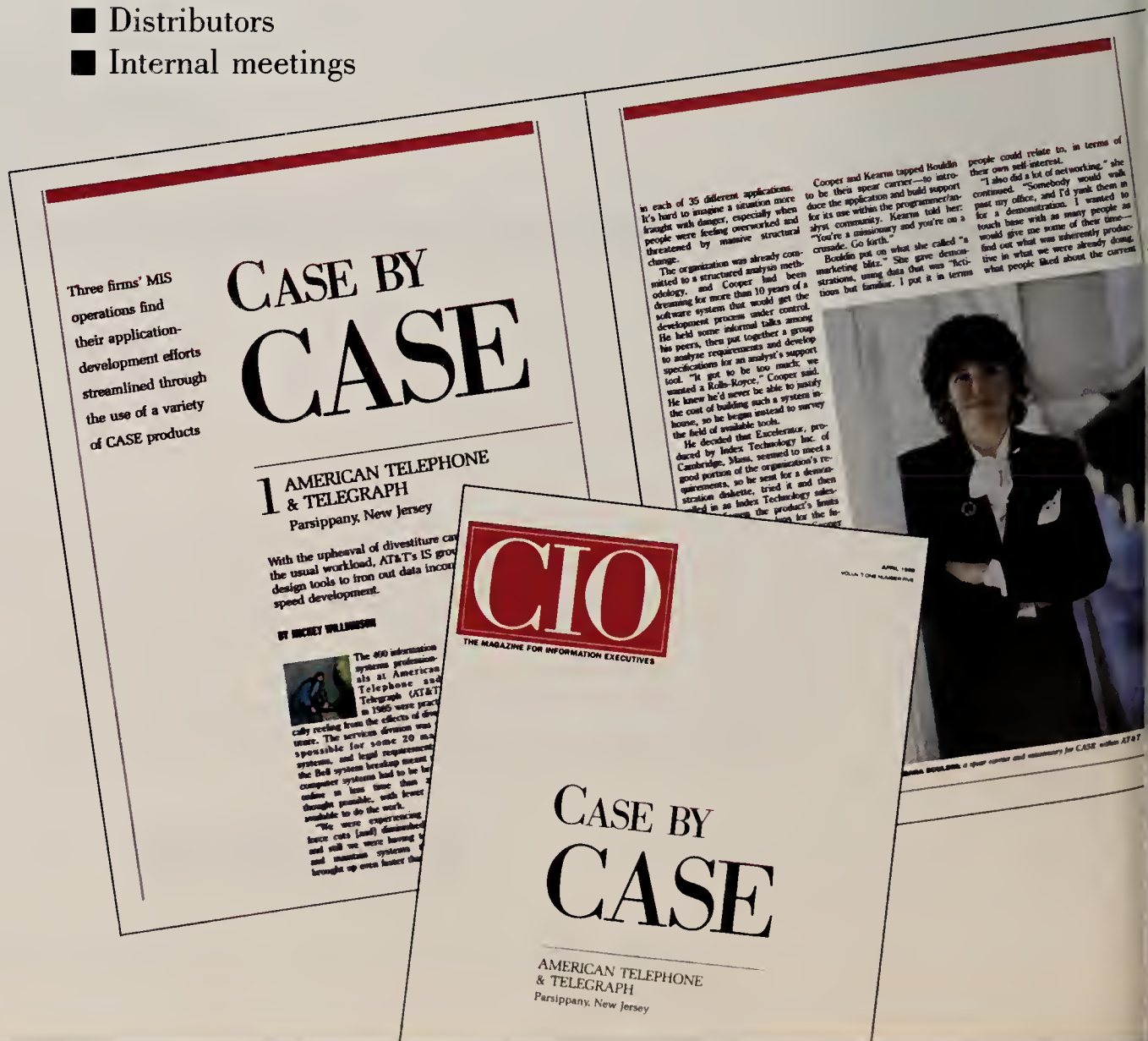
- Press
- Sales prospects
- Company seminars
- Trade shows
- Distributors
- Internal meetings

Reprints can be customized to include your advertisement, company logo, address and sales office listing.

For more information, call:

Lori Cardarelli
Marketing Services Manager
508-935-4631

CIO Magazine
492 Old Connecticut Path
P.O. Box 9208
Framingham, MA 01701



CONFERENCE CALL

QUESTION: *As a CIO, how do you rate the performance of IS consulting firms?*

It's been said that experience is a good but costly teacher. Small wonder that businesses implementing information systems often turn to experts in hopes of easing the learning process. Here, some CIOs grade the teachers.

George Fugere

MIS chief and VP of Operations Services at Bethlehem Steel Corp. in Bethlehem, Pa.

“We have been a client of Nolan Norton for some pretty difficult problems, and we have a high regard for them. The real strength of their seminars is that they give a balanced view on most issues, leaving the door open for discussion while presenting a methodology.

“If you want to talk about weaknesses, many firms try to sell you something before they know what the problem is. If they're in the seminar business, the seminars are generally weak and they only bait the hook, so to speak. There are an awful lot of people out there advertising themselves as consultants, and they very frequently don't have the talent in their employee base to work with. They hope they get a contract and then they'll hire somebody else to do it. You have to be very careful with that.

“When we were in [financial] difficulty, our agenda was one thing: survival. I didn't feel—nor did my fellow executives feel—that hiring somebody for strategic reasons was a viable alternative. We had to get our costs down and focus on profitability. Having reached a more stable environment over the last couple of years, we are thinking

more strategically.

“I would say this: The claim that consultants can help give you a strategic, competitive advantage is probably overstated. But I think there are companies where they could do that because the vision within the company isn't broad enough or far-reaching enough.

“You hear people say that all they do is come in and pick people's brains, put together a spiral-bound book for management and take credit for it. But if the IS group can't get its ideas across, that's a valuable service. Consultants are good at finding out what the issues are and packaging that information and getting it to management. I think that's where some of them have a real strength. A good written word these days is hard to come by. They don't teach English in schools anymore. And having people that can do that is a valuable service.”

William T. Houghton

President of Chevron Information Technology Co. in San Ramon, Calif.

“Some consultants have quite a bit to offer in the sense that they give you an alternative. They offer interpretations of technical trends and recent announcements that you can compare with your own view. I find that very valuable. They always take a position on an issue; they don't try to sit on the fence. And even if you don't agree with their position, it's valuable to compare yours with theirs.

“The second area where we find them valuable is if they happen to have some expertise in areas that we're interested in. We're trying very hard at the moment to learn about how to measure the productivity and quality output of our applications development staff. And we're searching for companies or consultants that have some expertise in this area. Generally speaking, we're finding that they'd be delighted to sit down and talk about ideas, but they don't have anything to bring to the discussion.

The facet that I'm the least attracted to is that they're in the business of providing some of the services that my staff already provides. I don't think that they have much to offer that's better than what we have. There are also issues with staff [members who may feel that their jobs are at risk]. Consultants must clearly demonstrate that they are bringing a talent or a skill that we don't already have.”

Frank Giannantonio

Vice president of information services for Book-of-the-Month Club in New York

“I think consultants give value to me as a customer because they have greater breadth of experience in the industry that I'm in. They also have bright, educated staffs and are obviously unbiased toward my own company's problems. Normally when we're looking at an issue within the company, people get very biased as to what solutions are acceptable. The consultant really doesn't have any axe to grind. And he has seen a number of similar cases at other companies, so he can bring that added value.

“Consultants can deliver what they promise if you keep them focused—very specifically focused. If you bring them in to facilitate or for a specific business problem, you need to focus their attention on the deliverable, what you expect from them and not what they would like to deliver as a consultant.”

Readers are invited to suggest Conference Call questions. Contact Staff Writer Meghan O'Leary at 508 935-4733 or by fax at 508 872-0618.



Presenting All The Systems Software You'll

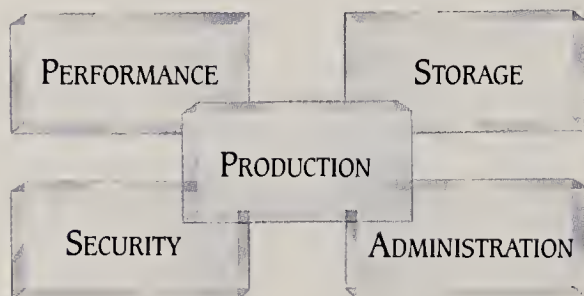
It's going to be quite a decade.

Every employee, every department, every division will be expected to do more—with less. Including the data center.

Especially the data center.

Demand for improved user service will reach new highs. Budgets and available resources will shrink. To succeed, data center managers will need to do the inevitable.

Automate.



Only CA UNIPACK solutions enable you to automate entire functional areas of the data center. Working together they deliver the ultimate in data center automation and service level performance.

Automating data center operations is the key to delivering the service levels businesses need to compete in the 90s. And that's why so many companies are turning to us. Over the years we've helped thousands of clients automate their data center operations and today according to Computer Intelligence, we offer more data center software solutions than anyone else in the world.

While hundreds of niche vendors each offer a few discrete products, our CA-UNIPACK® solutions can automate entire functional areas of the data center such as Production, Storage, Security, Performance Management, and Data Center Administration.

And now, with our new Computing Architecture For The 90s, the levels of integration and automation have been raised even higher. By sharing information and common services, the individual CA-UNIPACKS work together seamlessly



CA's Computing Architecture For The 90s protects and enhances the value of every CA software solution.

across multiple operating systems and hardware platforms.

The result is consistently higher levels of service. Improved response time. Investment protection. Maximization of personnel and hardware resources. And ultimately, a new breed of data center.

A data center that enables you to play a critical role in helping your enterprise compete and succeed in the 90s.

One of the most critical areas of data center operations to automate is production. We can help you automate all of it with one single step:

Production.



CA-UNIPACK®/APC—Automated Production Control.

It's the most advanced, and integrated package in the industry today and is currently used in thousands of MVS, VSE, and VM data centers around the world.

CA-UNIPACK/APC covers every aspect of automating production control processes including: automatic workload scheduling, automatic console message processing, automatic rerun/restart, automatic report

balancing, automatic report manipulation and distribution, JCL validation and automated job recovery.

CA-UNIPACK/APC integrates with other CA-UNIPACKS including the industry's most comprehensive, multimedia solution for system-managed-storage (SMS) and non-SMS environments:

Storage.



CA-UNIPACK®/ASM—Automated Storage Management.

It's by far the best way to maximize your investment in storage and resource management. Unlike IBM's solution, CA-UNIPACK/ASM works in both SMS and non-SMS environments, and addresses both tape and DASD management.

Some of the benefits include: automated tracking of tape library inventory, early warning and recovery facilities, DASD performance measurement, chargeback, destruction protection and automated volume cleanup.

It's the most effective solution for managing both tape and DASD resources.

Systems Management Need For The 90s.

CA-UNIPACK/ASM integrates with other CA-UNIPACKS including the most advanced security control and audit software in the world:

Security.



CA-UNIPACK®/SCA—Security, Control and Auditing.

It offers you a secure, protected environment across multiple hardware platforms, operating systems and wherever your distributed processing takes you including MVS, VSE, VM, VMS, networks, DB2 and PC/DOS.

CA-UNIPACK/SCA gives you access control, VTAM network control, network session management capabilities and an automated approach to reviewing operating environments.

It also integrates with other CA-UNIPACKS including the most comprehensive performance management and accounting solution ever developed:

CA-UNIPACK®/PMA—Performance Measurement and Accounting.

CA-UNIPACK/PMA's integrated approach includes: comprehensive online performance monitoring and

Performance.



historical reporting, expert system technology, resource accounting, chargeback, consolidated reporting and capacity planning.

This software solution also integrates with other CA-UNIPACKS including an automated, comprehensive approach to data center administration:

CA-UNIPACK®/DCA—Data Center Administration.

This integrated solution covers all aspects of data center administration including: inventory management, change management, configuration management and asset tracking.

It can help you produce instant and accurate network availability information. Quickly assess the impact of network failures. Produce current inventory reports. Provide consolidated reporting from multiple platforms such as IBM, Digital and PC's. Cut your vendor reconciliation time in half. Negotiate better maintenance contracts. And do many other administrative tasks that manual, error-prone methods simply

Administration.



cannot handle.

Every one of these CA-UNIPACKS is supported by CA-UNISERVICE®/II. This unique service and support system offers you a direct link between your mainframe and CA's Customer Service around the clock—and around the world.

Altogether, these CA-UNIPACKS can help you create the most productive data center possible.

A data center that's ready for the 90s. For more information on CA-UNIPACKS and all the Systems Management Software you'll need for the 90s, pick up the phone and call 1-800-645-3003.

It could be one of the last manual tasks you do.

And the most productive.



© 1990 Computer Associates International, Inc.,
711 Stewart Avenue, Garden City NY 11530-4787.
All trade names referenced are the trademarks or
registered trademarks of the respective manufacturer.

EVENTS

Enterprisewide Information Management Conference

Ritz-Carlton, St. Louis
September 4-7
Center for the Study of Data Processing
314 889-5380

Achieving success in strategic planning is the theme of this conference. Featured sessions include strategic planning in international business, architectures and strategic systems development, and re-engineering the IS organization. Registration fees: \$795 for members; \$895 for non-members.

FOSE's CD-ROM: Optical Systems for the '90s

Washington Convention Center, Washington
September 5 & 6
National Trade Productions Inc.
703 683-8500

This conference features intensive sessions for advanced and novice users of CD-ROM technology. Attendees can see actual CD-ROM projects in use at the exposition where 12 federal agencies demonstrate their applications. Admission for the conference and exposition is free.

Business Intelligence

Plaza Hotel, New York
September 11 & 12
National Expositions Co. Inc.
212 391-9111

Topics discussed at this conference designed for upper-level executives include how business intelligence works, the new generation of technology for business intelligence, understanding competitive in-

telligence, and monitoring science and technology. There are also sessions examining how European and Japanese companies use business intelligence. Registration fee: \$1,400.

Technology, Education and Knowledge for the 21st Century

Stouffer Orlando Resort, Orlando, Fla.
September 12-14
Cincinnati Bell Information Systems Inc.
407 661-8000

Topics discussed at this conference include the changing world of telecommunications, the power of market information, using image technology for customer reporting, executive strategies for the information age, professional productivity tools, and business relationships in the Pacific Rim. Registration fees: \$595-\$795.

MIS Strategic Planning for Corporate Success

New York Hilton, New York
October 22 & 23
Computer Economics Inc.
619 438-8100

Using information systems to change business processes and the way corporations compete is the main focus of this conference. Vendors discuss their customers' needs in the '90s and what directions they are taking to meet those needs. Other issues discussed include data center consolidation, outsourcing, cooperative processing, and distributed computing. Registration fee: \$1,095.

Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208—(508) 872-8200. **Postal Information:** CIO (ISSN 0894-9301) is published monthly by CIO Publishing Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Boston, MA, and at additional mailing offices. **Reprints:** Copyright 1990 by CIO Publishing Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: †. CIO can also be purchased on 35 mm microfilm from University Microfilm, Periodical Entry Department, 300 North Zeeb Road, Ann Arbor, Michigan 48106—(313) 761-4700. **Subscriptions:** Address subscription inquiries to CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208 or call (508) 872-8200. CIO is distributed free of charge to qualified top information executives. To all others, the one-year basic rate for the U.S. and Canada is \$63. For rates to other countries, please write the publisher. The single copy price is \$7. All subscriptions payable in U.S. funds only. Please allow four to six weeks for new subscriptions to begin. **Change of Address:** Please allow four to six weeks for change of address to take effect. **Postmaster:** Send change of address to CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208.



I N D E X

Page numbers refer to the first page of the article(s) in which the company is mentioned. CIO-100 companies are indexed on page 95. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Advertiser Index

AT&T.....	36, 104
AT&T Technologies.....	52
Bell Atlantic (Regional).....	96
CIO magazine and AMR International.....	86
CIO Publishing Inc.....	82, 98
Compaq Computer Corp.....	46
Computer Associates International Inc.....	2, 60, 100
Comshare Inc.....	C4
DataPreference.....	43
Digital Equipment Corp.....	C2
Dow Jones Information Services...	4
Eastman Kodak Co.....	39
Index Technology Corp.....	9
Installed Technology International.....	90
KnowledgeWare Inc.....	13
Legent Corp.....	19, 70
Manpower Inc.....	56

CIO Sales Offices

President and Publisher

JOSEPH L. LEVY
508 935-4601

Associate Publisher/ Director of Advertising Sales

ROBERT E. BLOCK
508 935-4735

Manager, Marketing Services

LORI CARDARELLI
508 935-4631

Advertising Sales Assistant

LISA B. SHIFMAN
508 935-4035

CIO Publishing Inc.
492 Old Connecticut Path
PO Box 9208
Framingham, MA 01701-9208
508 872-8200, FAX 508 872-0618

EAST COAST

Eastern Regional Director/ Advertising Sales

PAULINE MANNING

CIO Publishing Inc.
492 Old Connecticut Path
PO Box 9208
Framingham, MA 01701-9208
508 935-4039, FAX 508 872-0618

Microrim Inc.....	66
Minolta Corp.....	74
New York Telephone (Regional).	96
NewsNet Inc.....	41
Northern Telecom Inc.....	62
Nynex.....	6
Oracle Corp.....	21
Society for Information Management.....	103
Software AG.....	55
Tandon Corp.....	25, 27, 28, 30
The Wollongong Group.....	49
Xerox Corp.....	78

Company Index

AT&T.....	75
American Management Systems Inc.....	10
Baxter International Inc.....	22
CBS.....	34
Chrysler Corp.....	10
Dayton Hudson Corp.....	71
E.I. du Pont de Nemours & Co.	34
General Motors.....	22, 34
Honeywell Inc.....	10
K mart Corp.....	71
Mobil Oil Corp.....	71
NCR.....	34, 79
Sears.....	75
Teradata Corp.....	75
The May Department Stores Co.	71
Volkswagen.....	91
Wang Laboratories Inc.....	67

MIDWEST

Midwest Regional Director/ Advertising Sales

BILL McDONOUGH

Advertising Sales Assistant

CAROL LEE GOCKENBACH

CIO Publishing Inc.
10400 West Higgins Road, Suite 300
Rosemont, IL 60018
708 827-4515, FAX 708 827-9159

WEST COAST

Western Regional Director/ Advertising Sales

LINDA HOLBROOK

Advertising Sales Assistant

MARYANN DUYN

CIO Publishing Inc.
220 Montgomery Street, Suite 622
San Francisco, CA 94104
415 398-8200, FAX 415 398-4649

Information Management in Transition: Leading Business Transformation

“Overall an excellent experience. I continue to value talking with others as much as the program itself.”

“All sessions were of exceptional quality.”

“The workshop session was excellent — conceptual with examples. Good presenter.”

“Overall excellent program.”

These were just a few comments made by senior IS and business executives following SIM's 1989 Annual Conference in Atlanta. They discovered the value of attending the world's premier conference on information systems management. You too can benefit personally and professionally by attending SIM's 1990 Annual Conference, where an outstanding array of speakers will address many aspects of IS transition and business transformation. You'll benefit from:

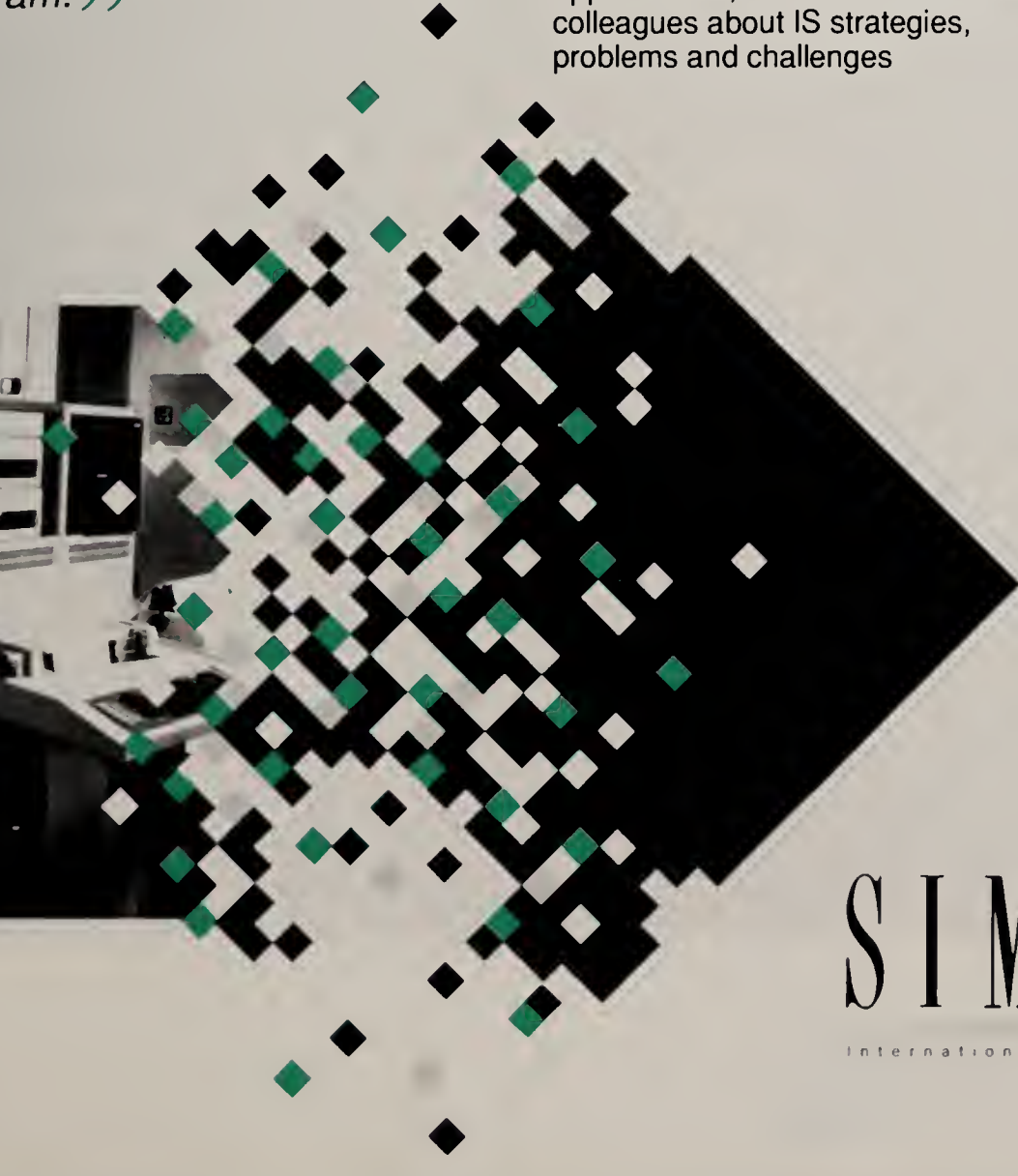
- Educational opportunities, for greater competence and professional development
- Frequent networking opportunities, to meet and talk with colleagues about IS strategies, problems and challenges

■ Professional award programs, recognizing industry leaders for their work, dedication and contributions

■ Social activities that take advantage of New York City's diverse surroundings

■ A spouse program designed to take advantage of the many cultural, historical and entertaining attractions in and around the city.

Find out more about this premier conference for IS executives. To request more information about the program and the early registration incentives, **write or call SIM Headquarters, 111 East Wacker Drive, Suite 600, Chicago, IL 60601 (312) 644-6610. Attn: David Lorenzo**



S I M
International

September 9-13, 1990
The Waldorf Astoria
New York City

Take your corporate rate
on the road.





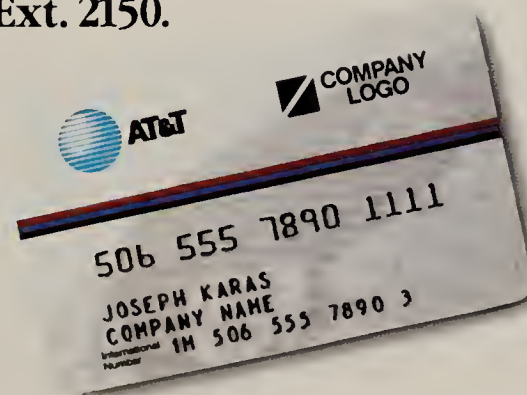
When your employees make business calls away from the office, your company may not be getting the savings it's entitled to. That's unless your employees use The *AT&T Calling Card* for Business.

Only AT&T ties calling card usage to every interstate volume discount plan we offer such as *AT&T PROSM WATS* and *MEGACOM[®] WATS*. So regardless of the size of your business, you always get the discounts you deserve. And your savings go where your employees go. From a phone booth in Muleshoe, Texas, to a hotel in the Big Apple.

But the advantages go beyond savings and easy access to the AT&T network. When you add our flexible *EXECU-BILLSM service*, you get a more efficient way of tracking and monitoring card expenses.

Billing is custom tailored to work the way your company works, whether you have one local office or many offices across the nation or around the world. You specify who receives statements and the level of detail each statement contains. We can even personalize your cards with your company's logo.

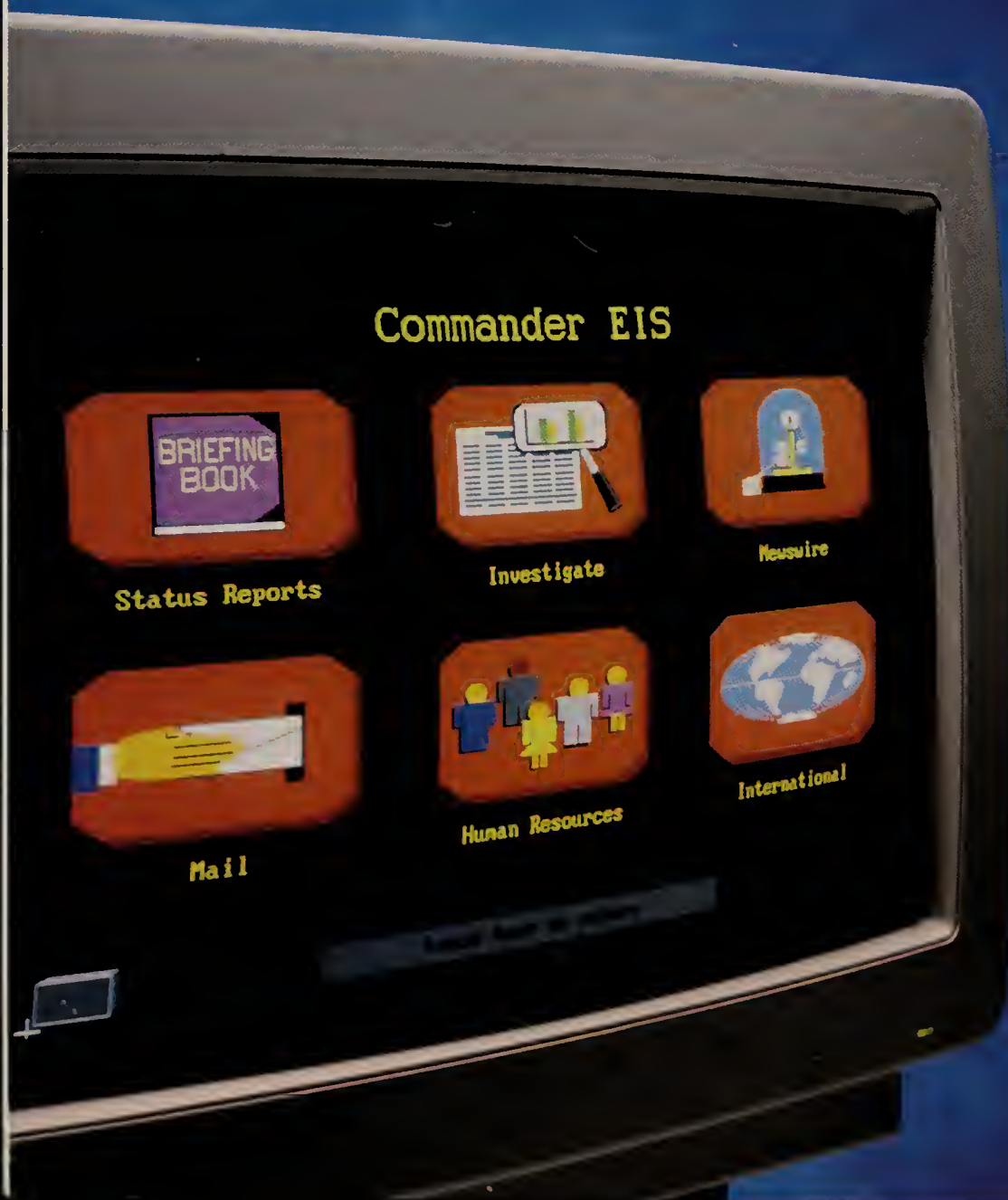
Your phone system just isn't complete without The *AT&T Calling Card* for Business and *EXECU-BILL service*. Find out how your company can get it free. Call your AT&T Account Executive or **1 800 222-0400, Ext. 2150**.



The *AT&T Calling Card* for Business.
Another AT&T advantage.

 **AT&T**
The right choice.

Get a QuickStartTM with the leading EIS for less than \$50,000



Introducing
Commander QuickStart:
the cost-effective way
to get started on your
Executive Information System

If cost is keeping you from getting started on an EIS, or if you're thinking of developing your own, here's good news: with Commander QuickStart you can start seeing results from your EIS for less than many companies spend just evaluating one.

The market leading EIS*

Commander QuickStart is a full-function version of Commander EIS, the industry's leading executive information system. It includes all you'll need to develop an EIS that will deliver results right away—software for PC, host and LAN, training, and consulting support.

More than a prototype

With Commander QuickStart, you can prototype an EIS, but it isn't just for show. It's the real thing, delivering real information. It can meet the EIS needs of a single department, or grow seamlessly to meet the needs of your whole organization.

Strategic information at your fingertips

From timely and graphic electronic reports, to the latest stock prices and news stories; from direct investigation of key corporate data, to an E-mail message, Commander EIS delivers the information executives need. Our advanced tools and open architecture make it easy to access, analyze, present and distribute information throughout your organization.

Get the facts on EIS!

For a free report, "What is an EIS?", and information about Commander QuickStart, contact Chris Kelly:

1-800-922-7979

In MI: 313-994-4800, Canada: 1-800-541-1780

*The results of an International Data Corporation Study show that Commander EIS is the leading Executive Information System with more than 50% of the market

Commander QuickStart includes 5 copies of executive workstation software, 2 copies of One-Up® multidimensional modeling software, host workstation management software, LAN administration capabilities, 3 days of training and 2 days of consulting

Commander and QuickStart are trademarks, and Comshare and One-Up are registered trademarks of Comshare, Inc. ©1990 Comshare, Inc. All rights reserved (9CEIS04)

COMSHARE

3001 South State St., Ann Arbor, Michigan 48106



August 1990

Dear Executive:

Imaging. It's the latest trend in information systems. You and I both know why: business faces fiercer competition, shorter product cycles, and increasing accountability. Paper-based systems fall further and further behind every day. Imaging is the answer.

If Kodak isn't on your list of imaging vendors, you're selling yourself short.

The fact is, we've been applying imaging to business problems since 1928. Compared to us, everybody else is a beginner. Ours has been an evolutionary approach, based on long-term investment in research and development, with thousands of successful customer applications. And we remain committed to imaging.

Our imaging solutions take your point of view.

An increasing number of our customers come from the IS world. We meet their needs with systems, components, media, and software backed by service and support only a "Fortune 100" company can provide. Furthermore, because we're not a computer vendor, we truly support the IS demand for interoperability and industry standards.

Isn't it worth one phone call to protect your IS investment?

Before you make any decision about imaging, call Kodak and find out how our expertise will help you. If a Kodak sales representative has not already contacted you, I invite you to call 1-800-44KODAK, ext. 302, and we'll get started today.

Sincerely,

A handwritten signature in black ink that reads 'David T. Giddings'.

David T. Giddings
General Manager Marketing and Vice President
Imaging Information Systems Group

P.S. There's no reason to delay implementing an entry-level imaging system. Kodak has everything you need, in place and ready to go. Make your move now and you'll give your company a crucial strategic advantage.



Put the efficiency and economy of imaging to work in your organization with Kodak products. We've got the solutions and technologies you need to capture, store, manage, and share document images in whatever form works best.

Microfilm, magnetic disk, optical disk—Kodak is a world leader in almost every image management technology. Choose the one, or the ones, best for your needs. Kodak experts will help you make the ideal choices, and help you keep things running smoothly.

We are more than photographs; we are imaging. For more details on images that mean business for you, call 1-800-44KODAK, ext. 302.

IMAGES THAT MEAN BUSINESS FOR YOU. KODAK

The new vision of Kodak

